KANARA FOREST RAILWAY

REPORT

KANARA FOREST RAILWAY

REPORT

Kanara Forest Railway Survey

Ragikumri (2½ miles east of Nagargalli Station S. M. R.ly) to Potelli 21 miles

Report by A. S. Gerrard Esquire Executive Engineer in charge Kanara Forest Railway Survey

References

Bombay Gt. G. Revenue Department No. 232 dated 12th January/88, deciding the question of placing the Forests North Kanara in direct Communication with the markets now opened by the Southern Marátha Country.

2 Extract from Demi-official letter from the Conservator of Forests S.C. dated 12th Jan/88 to the Executive Engineer in charge Kanara Forest Railway Surveys: stating that the best route for the Railway would be to start from Ragikumri on S. M. R.ly (2½ miles East of Nagargalli Station) via Birche and Potelli to Goond.

3 Consulting Engineer for Railways No. 435 dated 14th January/88 to the Executive Engineer in charge Kanara Forest Railway

Surveys concerning instructions regarding the line and its location.

4. The Executive Engineer in charge Kanara Forest Railway Surveys Nos 52 and 100 dated respectively 11th March and 8th May/88 to the Consulting Engineer for Railways Bombay forwarding Report Section and Plan of trial Survey from Ragikumri na Kurchi and Dandeli to Potelli.

5. The Executive Engineer in charge Kanara Forest Railway Survey No 57 dated 20th March 1888 to the Consulting Engineer for Railways Bombay forwarding copy of Conservator of Forests S C No 5380 dated 19th March 1888 fixing the Southern Terminus of the Railway.

6. The Executive Engineer in charge Kanara Forest Railway Survey No 151 dated 2nd July/88 to the Consulting Engineer for Railways Bombay reporting Summary of Season's Field Work.

7. Conservator of Forests S.C No 2080 dated 3rd August/88 reply to the Executive Engineer in charge Kanara Forest Railway Surveys No 164 dated 30th July 1888 regarding Estimated annual tonnage to be carried over the Railway

Report

I Location — An Index plan at a Scale of 1 Mile to the Inch is attached. The Consulting Engineer issued instructions that the line was to be located as far as practicable, under the guidance of the Conservator of Forests S.C. so that it should serve the Forests to the best advantage (vide reference 3 above). A reference was made to the Conservator of Forests S.C. with regard to the Location, and that Officer fixed the starting point or junction at Ragikumri, "3 Miles East of Nagargalli Station" S.M. Rly, and wished the line to be taken to Goond, via Birchi, and Potelli (vide reference 2 above). This was orally intimated to the Consulting Engineer Bombay, prior to the departure of the Staff for Field work.

Trial Lines were run from Ragikumri in the direction of Birchi through Dandelli to Potelli. The result was forwarded to the Consulting Engineer with Report, Plan and Section (Vide reference 4 above). Report was made to the Consulting Engineer assigning reasons for altering the Location from the Birchi route, to that via Dandelli, and also for finally adopting and staking the Birchi-Mahalinga (present) route to Potelli (vide reference 6 above). The Conservator of Forests S.C. subsequently decided, that the Southern Terminus of the

Railway should be at the junction of the Kumbarwada, Dandelli and Vernoli Roads at Potelli (vide reference 5 above). A rough prospection was made South of Potelli in the direction of Gyoond, but no trial lines were run.

——————2 Fourteen miles of the 21 miles from Ragukumri to Potelli were staked and fully Sectioned Surveyed &c; when the monsoon having fully set in the work had to be discontinued. The remaining portion of the line (7 miles) Mahalingee to Potelli was prospected and found to be of the same character as that from Ragukumri to Mahalingee ——————————

——————3. The Country lying between the highland of Haparpaili on the North, and the Potelli range of hills on the South, is drained by the Kali River, a perennial stream of Considerable magnitude. The river is 640 feet below Ragukumri, and 580 feet below the Potelli pass. The Country throughout is of an extremely rugged hilly description, being much cut up with deep ravines. It is covered throughout with thick jungle. The Railway for the first 14 miles runs down the plane of drainage, at right angles to the course of the Kali River, thence in the next 7 miles ascends, in the same direction the drainage plane to the summit of the Potelli Range of Hills. The line from mile 8 to 14 might possibly be made less circuitous on further Survey, but

it is doubtful, if this were done whether it would serve the purpose of the Forest so well. The line which has been staked at this season, is marked on the Index plan in a full red line, and the trial line (referred to in para 1 above) through Dandeli, and Kotelli is marked in a dotted red line from mile 6.

II — The chief objects of this Railway are, access to the Goond Plateau which contains first class teak timber (vide reference above), and to reduce the present excessive (Comparative) high rate of carriage of Forest produce from the Forest a rate which prohibits the timber etc being put into market at a Commanding price. Further, it is intended that through the agency of this Railway, the Forest Department should obtain the Command of distant markets To meet the last mentioned desideratum, a Junction with the S. M. R^y is an absolute necessity. The present proposed Junction at Ragikumri was selected (as stated in para 1 above), by the Conservator of Forests S.C as the position which would serve the Forest to the best advantage. The Agent of the S M. R^y Objected lately to a Junction between Stations. were a Junction made at Nagargalli Station the present route would have to be completely altered for the first 8 miles. It would after leaving Nagargalli, Enter the valley of the Katnal Nala, and follow the Course of that river

river to its Junction with the Birchi Nala —
———. To the S. M. Rly the advantages of a
Junction pertain rather than to the Forest —
Line. For instance, it is stated that the S. M. Rly
intend constructing a station between Nagargalli
and Londa, owing to the existing excess in —
distance between these Stations. The distance
from Alnawar (the next Station to Nagargalli)
to Nagargalli is 9 miles, and to the proposed
Junction 7 miles; Nagargalli to Londa is 12,
making a total of 21 miles from Alnawar to
[redacted]. To Equalise the distance between —
Stations the proposed Junction is in a precise
position, being 7 miles from Alnawar and 14
from Londa, further, the cost to the S. M. Rly
of a new Station between Nagargalli and —
Londa would in a high degree be met by
utilising materials, signals, sidings etc —
now at Nagargalli, whilst provision is —
made in accompanying Estimate for the cost
of a Station at Nagarmun. In short, the —
advantages of this proposal are, firstly, the
Saving in cost of erecting a new Station and
Secondly of equalising the distance between —
Stations on the S. M. Rly thus facilitating —
traffic. — — — — — —
III — Levels and Gradients. — an Index
Section at scales 1 mile to the Inch horizon-
-tal and 100 feet to the Inch vertical is —
attached, from which the main features
of —

of the Line as regards Levels, and Gradients can be seen at a glance. These are briefly as follows.

1st ly — In the first 1½ miles, a descent of 136 feet is made from Rage = = Kumri, with 1 in 50 and 1 in 37 grades, broken with short lengths of level to facilitate working.

From the 1½ mile to mile 2½, there is a fall of 36 feet, with Counter = grades in short lengths.

3rd ly — From mile 2½ to mile 3¾, there is a fall of 186 feet, with a grade of 1 in 37 broken at intervals with short = lengths of Level, and Countergrades.

4th ly — From mile 3¾ to mile 8½, the Line = falls 204 feet, with constantly re = = curring short Countergrades, and pieces of level.

5th ly — From mile 8½ to mile 14 (Kali River) the fall is 97 feet, with Countergrades and pieces of level.

The total fall in the first 5½ miles is 652 feet, and in the last 5½ miles 87 feet, making a total of 639 ft

6th ly — The rise from the Kali River to Kotelle is 580 feet.

The orders first Conveyed by the Controlling Engineer were, that a rising gradient

of 1 in 50 should be adopted, but he afterwards sanctioned 1 in 37 as the ruling grade, as it was found after most careful, and exhaustive trials, that a less steep gradient could not be worked to with economy.

A Catch siding has been provided at Ragikumri.

IV Stations. The following are the Stations

1 Ragikumru Junction - Mile 0 - At this Station it is intended that a Forest Depôt should be formed near the Station There now exists a Depôt on the North of the S M X^g, the Forest Line approaches that Railway on the South. The Station is on the level

2 Cobural - This station is on the level at Mile 7½, and is intended as a Crossing Station It is available for trading Forest produce from Birche, and surrounding District

3 Mahalinga - Mile 13¾. This Station is on the North Bank of the Kali River is on the level, and is available for conveyance of Forest produce from the Mahalinga existing Depôt

4 Potelli - Mile 21 This is the Southern Terminus fixed by the Conservator of Forests S.C, on the summit of the Potelli range of hills, from this Station the whole of the Forest produce

South

South of the Potelli hills, the valley of the Kamony River, and the Goona Plateau will be Conveyed. There is ample space available at the Station site for forming an extensive Depot.

The average distance between Stations is 7 Miles.

V Bridges. There are no Bridges which come in the Category of Large Bridges. The Bridges on the first seven miles are —

1 of 5 Spans of 20 feet

1 of 10 " " and

1 of 4 " " all on Trestles with timber girders. A type drawing for these is attached. It is designed on scantlings which will admit of the timber being available for Cutting into Sleepers, when the Bridge is dismantled.

There are no Culverts; it is proposed to leave the drainage under the Line with Carefully packed dry Boulder or Stone drains the Boulder work in some instances being Carried up to Formation, the Reduced Levels to which this work is to be Carried is shown on the Working Section.

For Crossing the Kali River, provision has been made for log Stacks & timber girders

Throughout, the beds of all rivers, and Nalas are rock of a very Compact nature.

VI Labor and Rates. All the Estimated rates, excepting woodwork, and Sleepers, were obtained from the S. M. Rly Company, allowance being made for Forest Jungle work.

The labor will have to be imported, as the District traversed is practically unpopulated.

VII Materials — Stone for building is obtainable throughout. At Dandelli there is an outcrop of good Laterite. Kunkur for lime is obtainable in a limited quantity, in beds of small halas at and about Burchi-Mile 7. The quantity of lime necessary for carrying out the Construction of this Railway is comparatively small.

VIII Estimate — The line is to be the same gauge as that of the S. M. R^y, Viz Metre Gauge. The Estimate submitted herewith is prepared for the first 14 Miles from the Working Section quantities of Earthwork, Bridging, and Permanent Way, and for the remaining 7 Miles (with the sanction of the Consulting Engineer) they have been framed on a Mileage rate.

Preliminary Expenses are entered at the sum shown in the last Budget Estimate, a Saving is anticipated on this head.

Land — No provision is made, as the Railway is a Forest Line and passes through Forest Land.

Earthwork provides for formation widths of 12 feet in Bank, and 18 m all Cuttings.

Bridgework is treated in para V above.

Tunnels — There are no Tunnels.

Level Crossings — There are two, Class B, for which provision has been made, and 40 units of Maintenance Gang Huts have been.

been provided for. There is one road diversion (Miles). The Cost of this will be met by savings on the Level crossing Estimate Contingencies-Fencing)—No provision is made for Fencing.—Electric Telegraph;—No provision has been made as it is proposed to work the Line on the Staff system and night running is not intended.—Ballasting.—no provision now been made, as it is intended that the line should be a fair weather line, to be closed during the Rainy Season Permanent Way, is calculated on rates given by the S. Mn. R^y for Rails, and Fastenings. New 41½ lbs Steel rails have been provided at Rs 65/- per ton at Marmagoa and 0/10- per ton mile for carriage etc to Ragikumri. a very considerable saving might be effected on this head if 2nd hand rails were obtainable. Correspondence was entered into with the Agents S Mn. R^y and R. Mn. S. R^y regarding these. The former replied he had none available, and a reply is awaited from the latter. The Sleepers are at one Rupee each. The Estimate includes—Sidings, points, and crossings etc. No provision has been made for English Charges, as the Cost of the Rails & Fastenings may be effected by transfer from another

Railway.

Stations and Offices :— No provision has been made for Stations and offices except at Ragitumri Junction with the S. M. R^y, where an office is provided for a Station Master, as further quarters have been deemed unnecessary by the Consulting Engineer and the Conservator of Forests S C —

Workshop and Store Buildings — No provision made, as it is proposed that all Rolling Stock would be hired from the S. M. R^y Company.

Staff Quarters :— Provision has been made for the following quarters at Ragitumri Two Guards, and Two Drivers, one Permanent Way Inspector, a Station Master with an Assistant, 2 units Each ; at Potelli, a Running Room of 3 units (Drawings attached) In addition to the above, quarters have been provided for a Jemadar at Each of the Crossing Stations. Also Female quarters 4 units at Ragitumri and Potelli respectively. A drinking well has been provided at Colaral, as the water at that place is considered very injurious for drinking purposes. Corrugated iron roofing has been adopted for all quarters, excepting Female quarters and Permanent Way gang huts. — — —

Station Machinery — The necessary Station Machinery has been provided for the —

efficient

efficient working of the line, but no provision has been made for night running, as it is not considered necessary. Full provision has been made, however, for the Junction Signals on the S. In. Rly. Wells are provided at Ragikumri, and Potelli only, as Engines can water at the Birchi Nala and the Kali River. A Stabling shed is provided for Engines at Ragikumri

Plant - Engineering - is exclusive of all tools for works which are supposed to be covered by the rates. Provision has been made for Material Trolley, and Maintenance Tools and Plant also Instruments, and Tents.

Plant :- Locomotive.
" " Carriage Wagon } vide. Rolling Stock

Station and Office Furniture :- Provision has been made for Furniture for Construction Office, and Running Room. The former, after completion of the line can be utilised for Station Masters Office Ragikumri

Rolling Stock - No provision has been made, as it is proposed to hire Locomotives Wagons etc from the S. In. Rly. That Railway will give, and keep up, an Imprest of Wagons for transport to destination, making over an equivalent number of Empties. If the S. In. Rly Stock is used, then the existing small Radii Curves must necessarily be

altered

altered to suit their Stock This can be affected at a slightly increased expenditure in Earthwork.

Establishment is made on probable requirements, and on the supposition that the work is carried out in 1½ years. Provision has been made for Office Charges only of Direction and Audit

The total estimated cost of the Railway including all charges excepting Rolling Stock is Rs 3,42,354. Of which, the Cost of Permanent Way is Rs 1,78,000 or more than half the total estimated amount.

The total length including Sidings is 22¼ Miles and the average cost per mile is Rs 15,387.

If Rolling Stock is to be provided an addition of Rs 140,000 should be made to the attached estimate.

IX With regard to the Financial prospects of this Railway, Major Trelawny RE in his report dated 17th June 1887, Estimated 26,000 tons as the annual tonnage to be Carried over the Railway, this figure was arrived at from the annual Yield Estimate in para 51 of Col. Peyton's report. A reference was made to the Conservator of Forests S.C on the

this subject, but no definite information was received. (Vide reference 7 above).

In the absence of a means of verifying Col: Peyton's Estimate referred to above, 26,000 tons is adopted as the Estimated tonnage to be carried annually; Although the Terminus of the Line has been changed from Govind to Potelli, no alteration caused thereby in the Annual Yield has been taken into Consideration.

The following table shows the probable Annual Expenditure on this Railway, Calculated on Train Mile, and Ton Mile haulage rates, obtained from the S.M. Rly for the half year Ending 31st December 1884

Items	Train Mileage	Ton Mileage
Interest at 4 p.c. on Estimated Capital Rs 342,354 (Excluding Rolling Stock) = 13694		
do do on probable Cost of Rolling Stock Rs 140,000 = 5,600	19,294	19,294
For 26000 tons with a limit of 40 tons per train, 650 loaded trains, and 650 return Empties, are required, making a total of 1,300 over 21 miles, or 27,300 train miles @ Rs 1-66 per train mile	45,600	
For 26000 tons per mile, over 21 miles, the total number of ton miles is 546000 @ 6-92 pies per ton mile		19,680.
Total	64,794	38,974

Note — No amount is entered for profit to S.M. Rly on account of hire of Stock, as their train, & ton mile, rates Cover the full Staff, working, & maintenance, of an open Line, & are higher than the anticipated rates on this Railway

The great difference in the Estimated Cost of working on the Train Mile, & Ton Mile rates, Can be accounted for in part by the fact that no debit has been made for the return Empty trains under Ton Mile rate Estimate, that Estimate is therefore too low to work to. On the other hand the Estimate framed on Train Mile rate is very full, the rate for Carriage being calculated on Load both ways over the line, whilst a saving could be looked for in the haulage of return Empties. ——————

——— It may be mentioned par parenthèse, the working expenses are based on the ground, that the gross tonnage to be carried annually is to be Conveyed over the whole length of the line whereas a Considerable portion of it will probably be carried Comparatively short distances which would Conduce to a further Saving on the Train Mile Estimate.

* The following table based on Col. Peytons Estimate of annual gain to Government, and the Estimated Cost of adopting Railway Agency, shows the Estimated annual net gain to Government Revenue by the project -

Items	Train Mileage	Ton Mileage
Col: Peytons Estimated annual gain to Govt (in which he excludes all Railway charges)	3.11200	3.11.200
Deduct Annual Cost of Maintaining and working and the Interest on the Capital Cost of the Railway	66.794	38974
Estimated annual net gain to Govt.	2.46.406	2.72 226

In fine it may be paid from the above Estimate, allowing a margin for Contingencies, and accepting the higher of the two rates (viz, the Train Mileage rate) for working the this Railway, the annual net gain to Government in Revenue, if this project is carried out will be Rs 2,40,000. *

X. [redacted] Winding Ex-[redacted]ld probably increase the Traffic of the Railway and greatly facilitate the working of the Forest by expediting, and cheapening the Carriage of timber, especially on the Steep Slopes of hills, and the Kanery River under Goond, and of reaching otherwise inaccessible places, their application to Forest work is worthy the favourable Consideration of Govern = ment.

Moreover, the perennial streams with a Comparatively small Expenditure, might be made available for working Turbines to drive saws, for squaring and cutting up timber, and preparing it for the market in a similar manner, and form, to that adopted in the Thoulmein Forests.

Hazarmachi
24th Sep/88

B. Ginary
Executive Engineer-in-charge
Kanara Forest-Railway Survey

Reference No 2.

Extract from demi-official letter from the Conservator of Forests S.C. dated 12th January 1888 to the Executive Engineer-in-charge Kanara Forest Railway Survey.

× × ×

I think your best line would be roughly from Ragi-Kumri, 5 miles east of Nagargali, via Birchi and Potoli to Gund.

The Country is hilly all along the line: good steep hills but not mountainous except in the neighbourhood of Gund. I believe it is very mountainous about Gund and for several miles this side of that village from Potoli onwards but I have never been nearer than 8 miles or so of Gund. Mr. Richey suggests, in his note, starting from Nagargali but I think you'll find the line from Ragikumri better.

× × ×

"True Extract"

P. Kenny
Executive Engineer in-charge
Kanara Forest Rly Survey.

Reference No. 7.

Copy of letter from the Executive Engineer in Charge Kanara Forest Rly. Survey No. 169 dated 30th July/88 to the Conservator of Forests S.C.

I have the honor to state, it is necessary for me to give in my report for the Project and for the purpose of the Estimate of the Railway "information about the probable traffic". Col. Firebrace, Consulting Engineer for Railways, Bombay, in his report dated 17th June 1887 Estimates 26,000 tons as the gross tonnage to be carried annually over the Railway.

I have the honor to enquire, whether I would be correct in adopting this figure, if not I should be much obliged by your informing me at the earliest possible date what figure I should base my calculations upon.

Extract from letter from Conservator of Forests S.C No. 2080 dated 3rd August/88 to the Executive Engineer-in-Charge Kanara Forest Railway Survey.

In reply to your letter No. 169 dated 30th

30th ultimo, I have the honor to observe that it is not clear from your letter if you refer to the proposed line from Nagargali to Gund, or to the proposed line from Alnawar to Potoli. Presuming however, that you mean the latter, I have no more information on the subject than is contained in the correspondence in your possession.

× ×

True Extract:-

P. Swan

Executive Engineer in charge

Kanara Forest Rly Survey.

Kanara Forest Railway

Raya Kumri to Potelli :- 21 Miles

Forecast of Financial prospects to accompany Estimate in accordance with Government of India, Public Works Department Code Volume III chapter IV para. 7.

No. I.

Summary of the Estimated charges to Capital account.

Year	Works including Loco Plant	Establishment	Total
	2	3	4.
	Rs	Rs	Rs
First	2,18,080	22,284	2,40,364
Second	94,562	7,428	1,01,990
Total	3,12,642	29,712	3,42,354

No. II

Summary of the estimated indirect charges to Capital (excluding interest)

Year	Capitalization of Abolition of Land Revenue	Leave and Pension allowances	Total
	2	3	4.
	Rs	Rs	Rs
First	Nil	3,120	3,120
Second	"	1,040	1,040
Total		4,160	4,160.

Calculations for Financial Forecast

Direct charges to Capital

1st Year.

	£.
Preliminary Expenses (whole of Estimate)	18,500
Earthwork, ⅔ of Estimate	31,550
Bridgework ½ of Estimate	10,706
Level Crossings (whole of Estimate)	6,966
Permanent Way ⅔ of Estimate	1,18,667.
Staff Quarters, ¾ of Estimate	13,457.
Station Machinery ¾ of Estimate	11,087.
Plant (whole of Estimate)	8,107.
Establishment, ¾ of Estimate	22,284.
Total 1st Year	£.40,364.

2nd Year.

Earthwork, ⅓ of Estimate	15,775
Bridgework ½ of Estimate	10,706.
Permanent Way ⅓ of Estimate.	59,333.
Stations & Offices (whole of Estimate)	567.
Staff Quarters ¼ of Estimate	4,486.
Station Machinery ¼ of Estimate	3,695.
Establishment ¼ of Estimate	7,428.
Total 2nd Year	1,01,990.

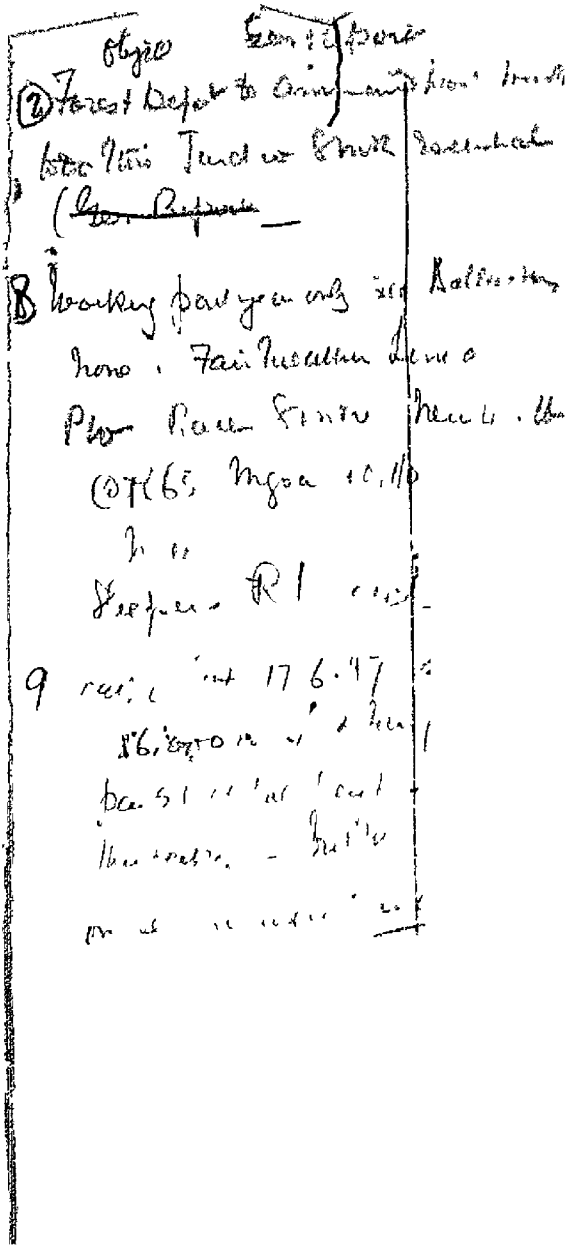
Total Direct Charges 3,42,354.

Table Nos III and IV.

This Railway is not intended to be opened for public, but for Departmental Traffic and the Forecast of Finance is based on an estimated annual Forest yield. The net annual gain to Government Revenue is estimated at Rs 2,46,000 vide Report. para IX.

Hazarmachi
24th September/98

P. Ferrary
Executive Engineer-in-charge
Kanara Forest Railway Survey



KANARA FOREST RAILWAY

ESTIMATES

KANARA FOREST RAILWAY

ESTIMATES

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Kanara Forest Railway

Preliminary Estimate

Rajakumri to Potelli :- 21 Miles

Cl	Main and Minor Heads	Amount Rs	Total Rs
I	Preliminary Expenses		
	1. Survey Expenses	18,500	18,500
	2. Plant		
	3 Establishment		
II	Land	Nil	Nil
III	Construction of Line		
	1 Earthwork	47,325	X
	2 Bridgework	21,412	
	3 Tunnels	Nil	
	4 Level Crossings, huts, lodges etc	6,006	
	5 Fencing	Nil	
	6 Electric Telegraph	Nil	74,743
IV	Ballast and Permanent Way		
	1. Ballasting	Nil	
	2 Permanent Way	1,78,000	1,78,000
V	Stations and Buildings		
	1 Stations and offices	567	
	2 Workshop Store buildings etc	Nil	
	3 Staff Quarters	17,943	
	4 Station Machinery	14,782	33,292
VI	Plant		
	1 Engineering	7,687	
	2 Locomotive	Nil	
	3 Carriage and Wagon	Nil	
	4. Station and office Furniture	420	8,107
VII	Steam Ferries	Nil	Nil
VIII	Rolling Stock		
	1. Locomotive Stock	Nil	
	2 Carriage & Wagon Stock	Nil	Nil
IX	Establishment		
	1 Direction or general		
	2. Engineering		
	3 Locomotive including Carriage & Wagon	Nil	
	4. Stores	Nil	29,712
	5. Audit and account		
	6 Medical & Sanitation		
	Grand Total	Rs	3,42,354

Cl Rs 16303 per Mile

B. Ginary
Executive Engineer
In charge

Kanara Forest Railway

Kagikamui to Potelli :: 21 Miles

Preliminary Expenses

Quantity	Items	Rate	Per	Amount
	Preliminary expenses as per last Budget Estimate			18,500
			Total	18,500.

S. H. Gray

Executive Engineer in Charge

Kanara Forest Railway

Ragikumri to Potelli :- 21 miles

III Construction of line

1. Earthwork

Quantity	Description	Rate Rs	Per	Amount Rs
Cft 71,62,000.	Earthwork in Banks & Cuttings	6	1000 Cft	42,972
21 miles	Cutting Jungle	100	1 Mile	2,100
	Total			45,072
	Add Contingencies	5	100	2,253
	Total Estimate			47,325.

P. Ferrary
Executive Engineer
In charge

Kanara Fore

Ragikumri &

III Construc

Abstract Cost of Brun

Items	Rate	Per	Wry Nalla 5-20' Bridge		4-20 ft. Bridge at ch 110		Birchi 10-20
			Quantity	Amount	Quantity	Amount	Quantity
	Rs			Rs		Rs	
Excavation in Foundn	20	%o cft	800	16	780	15	1800
Concrete	18	%o "	900	144	780	140	1800
Woodwork	1	Cft	794	794	685	685	3196
Sleepers	1	Each	80	80	64	64	160
Stone Pitching	6	%o cft	1790	107			4000
Ramming Earth in Abutment	5	%o "	47.000	235	17.290	86	97.000
Iron work	20	Cwt	5	100	5½	110	13
Boulder Filling	20	%o cft					
Temporary Bridge over the Kali River	2000	L.S.					
Total				1476		1100	
Add Contingencies	5	o/o		74		55	
Grand Total				1550		1,155	
Add for length between Nalla Ginge and Potelli at Mileage rate of 7 miles							
Total for whole line							

...t Railway.

...Kotelli - 21 Miles.

...tion of Line

... Bridges.

...alla Bridge	Kali Nivers		Boulder Filling		Total		Remarks
Quantity	Quantity	Amount	Quantity	Amount	Quantity	Amount	
~~Rs~~		~~Rs~~		~~Rs~~		~~Rs~~	
36					3,380	67	
324					3,380	608	
3196					4,675	4,675	
160					304	304	
240					5,790	347	
485					1,61,290	806	
260					23½	470	
			2,15,900	4,318	2,15,900	4,318	
	L.S.	2000			L.S.	2,000	
4701		2000		4,318		13595	
235		100		216		680	
4,936		2,100		4,534		14,275	
						7,137	
						21,412	

S. Lenary

Executive Engineer in charge

Kanara Forest Railway

Ragikumri to Potelli : 21 Miles

III Construction of line

4. Level crossings

Granks	Description	Rate Rs	Per	Amount Rs
Nos 2	Class B	260	Each	520
10	Permanent huts for Kanara gangmen	63		5.200
	Total			5,720
	Add Contingencies	5	100	286
	Total Estimate			6,006

Executive Engineer in charge

Kanara Forest Railway

Nagikurmu to Potelli - 21 Miles

IV Ballast and Permanent Way

Permanent Way

Quantity	Item	Rate Rs	Per	Amount Rs
	Cost of 1 Mile of Permanent Way.	Rate		Amount
64½	Tons Rails assorted	@ Rs 65		4,193
2	Fish Plates	" 75		150
¾	Bolts	" 200		150
2⅝	Spikes	" 135		354
70	Carriage of Rails & Fastenings from Marmagoa - 86 Miles	" 5½ per ton per mile		372
2100	Sleepers	" 1/-		2,100
	Laying	" 300		300
	Cost per Mile	Rs		7,619
	Length of Line			
	Main Line - Miles	21.00		
	Siding Nagikurmu "	0.50		
	" Colonial "	0.15		
	" Mahalinga "	0.16		
	" Potelli "	0.45		
	Length of Line =	22.25 Miles		
Miles 22.25	Permanent Way	7,619	Mile	1,69,523
	Add Contingencies	5	o/o	8,477
	Grand Total			1,78,000.

B. Feray
Executive Engineer in Charge

Kanara Forest Railway

Ragikumri to Potelli :: 21 Miles

V Stations and Buildings. I Stations & Offices.

Station Master's Office at Ragikumri

Quantity	Items.	Rate	Per	Amount
	Cost of Station Master's office being proportionate charges deducted from Estimate for Station Master's Quarters under Staff Qrs.			540
	Add Contingencies	5	%	27.
	Grand Total			567.

B. F. Fenaw
A/E

Executive Engineer in charge

Kanara Fo
Ragikunnu
V Stor
Abstract Cost of

Items.	Rate Rs	Per	Running Room		P. W. Office Qrs		Guard's & Drug q	
			Quantity	Amount Rs	Quantity	Amount Rs	Quantity	Amount Rs
Excavation for Foundn	5	c/o Cft	751	4	613	3	2452	12
Concrete	18	c/o Cft	606	109	579	104	2314	417
Masonry in Lime	25	"	1,501	375	1110	278	4440	1.110
do Mud	1.	"	1.624	232	1.140	171	4560	684
Walls and Mud	4	c/o Sqft	463	18	399	16	1596	64
Plastering in Lime	6	"	76	5	38	2	152	9
do Mud	2-8-0	"	2,562	64	2052	51	8,206	205
Pointing	4	"	2,431	97	1075	43	4,300	172
Whitewashing	"-6-0	"	2,638	10	2090	8	8,358	31
Earthfilling	5	c/o Cft	1.008	5	852	4	3,408	17
Doors Windows glazed	1-4-0	Sqft	75	94	72	90	286	358
do Batten	"-10-0	"	52	33	53	33	212	133
Arch Masonry in Lime	50	c/o Cft	22	11	16	8	62	31
Woodwork in Roofing	1-8-0	Cft	46	69	37	56	148	222
Corrugated Iron roofing	40	c/o Sqft	1,553	621	1.312	525	5250	2 100
Earth flooring	5	c/o Cft						
Tile Roofing	15	c/o Sqft						
Latrine	10	unit						
Drinking well	800	1						
Total				1747		1392		5565
Deduct proportion of Cost of Office of Sr. Master included in this Estimate								
Total				1747		1392		5565
Add Contingencies	5	c/o		94		70		279
Grand Total				1834		1462		5844

est Railway
Potelli :- 21 Miles
ions and Buildings
Staff Quarters.

Station Buildings		Barracks qrs		Out Buildings		Latrine		Drinking Well		Total	
Quantity	Amount Rs	Quantity	Amount Rs	Quantity	Amount Rs	Quantity	Amount Rs	Quantity	Amount Rs	Quantity	Amount Rs
4124	6	2,480	12	1008	5					8,428	42
										3,499	630
2194	549	4,198	1048	1706	426					15,149	3,786
2815	422	12,860	1930	5224	784					28,143	4,223
274	11									2,732	109
										266	16
4,500	113									17,320	433
2,314	93									10,120	405
4,482	17									17,568	66
1,300	6									6,568	32
98	123									531	665
170	107	400	250	163	102					1,050	658
										100	50
67	86									288	433
1,860	774									9975	3,990
		5,120	26	2080	11					7,200	37
		5,244	796	1712	320					6,956	1,106
						15	150			15	150
								1	800	1	800.
	2277		4052		1,648		150		800		17,631
	540										540
	1737		4,052		1648		150		800		17,091.
	87		200		82		8		40		8,62
	1,824		4,252		1,730		158		840		17,943

S. Lemay
Executive Engineer in Charge.

Kanara

Ragikumri to

V Stations and Buildings

Ragikumri

Items	Rate Rs	Per	Station Master's Quarters Quantity	Station Master's Quarters Amount Rs	P. W. Inspector's Quarters Quantity	P. W. Inspector's Quarters Amount Rs	2 Guards & 2 Drivers Quarters Quantity	2 Guards & 2 Drivers Quarters Amount Rs
Excavation for founds	5	c/o c/ft	1,124	6	613	3	2,452	12
Concrete	18	c/o			579	104	2,314	417
Masonry in Lime	26	c/o "	2,194	549	1110	278	4,440	1,110
do Mud	15	c/o "	2,815	422	1140	171	4,560	684
Walls and Mud	4	c/o Sq/ft	274	11	399	16	1,596	64
Plastering in Lime	6	"			38	2	152	9
do Mud	2/8/-	"	4,500	113	2052	51	8,206	206
Pointing	4	"	2,314	93	1075	43	4,300	172
Whitewashing	1/6/-	"	4,482	17	2090	8	8,358	31
Earthfilling	5/-	c/o c/ft	1,300	6	852	4	3,408	17
Doors & Windows Glazed	1/4/-	Sq ft	98	123	72	90	286	358
do Balau	1/0/0	"	170	107	53	33	212	133
Arch Masonry in lime	50	c/o c/ft			16	8	62	31
Woodwork in roofing	1/8/-	c/ft	57	86	37	56	148	222
Corrugated iron roofing	40	c/o Sq/ft	1,860	744	1,312	525	5250	2,100
Earth flooring	5	c/o c/ft						
Tile Roofing	15	c/o Sq/ft						
Latrines	10	Each						
Total				2,277		1,392		5,566
Deduct proportion of cost of Office included in this Estimate				540				
Total				1,737		1,392		5,566
Add Contingencies	.5	c/o		87		70		278
Grand Total				1,924		1,462		5,844

Forest Railway
Potalli .. 21 Miles

3 Staff Quarters
1 Station

Grenials &c		Cart Buildings		Latrine		Total		Remarks.
Quantity	Amount Rs	Quantity	Amount Rs	Quantity	Amount Rs	Quantity	Amount Rs	
1085	5	775	4			6.049	30	
						2,893	52	
1.837	459	1,313	328			10,849	2,724	
5626	824	4.018	603			18.159	2,724	
						2,269	91	
						190	11	
						14.758	369	
						7.689	308	
						14.930	56	
						5.560	27	
						456	571	
175	109	12.5	78			735	460	
						78	39	
						242	364	
						8,422	3.369	
2240	11	1,600	8			3,840	19	
2294	344	1.638	246			3,932	590	
				7	70	7	70	
	1,772		1,267		70		12,343	
							540	
	1,772		1.267		70		11.803	
	88		63		4		590	
	1,860		1330		74		12.393	

S. Ewart
Executive Engineer in charge.

Kanara Fores

Ragikumri to Pol

V Stations & Buildings

Crossing Stations a

Items	Rate Rs	Per	Mahalingpe Station					
			Menials Quarters		Latrine		Total	
			Quantity	Amount Rs	Quantity	Amount Rs	Quantity	Amount Rs
Excavation in Foundn	5	c/c ft	155	1			155	1
Masonry in Lime	25	c/c "	262	65			262	65
" Mud	15	c/c "	804	121			804	121
Earth flooring	5	c/c "	320	2			320	2
Doors Baton	1/10	Sft	25	16			25	16
Roofing work tiles	15	c/c "	328	49			328	49
Latrine	10	No 1			2	20	2	20
Drinking Well	800	"						
Total				254		20		274
Add Contingencies	5	c/c		12		1		13
Total Estimate				266		21		287

t Railway

lli : 21 Miles

3. Staff Quarters

t Cobural & Mahalinge

Cobural Station.								Remarks.
Inmates Qrs		Latrine		Drinking well		Total		
Quantity	Amount Rs	Quantity	Amount Rs	Quantity	Amount Rs	Quantity	Amount Rs	
155	1					155	1	
262	65					262	65	
804	121					804	121	
320	2					320	2	
25	16					25	16	
328	49					328	49	
		2	20			2	20	
				1	800	1	800	
	254		20		800		1074	
	12		1		40		53	
	266		21		840		1127	

B. Fulay

Executive Engineer in charge.

Kanara Fores

V Stations & Buildings

Potelli

Raji Kanwri to Potelli

Items	Rate Rs	Per	Running Room Quantity	Running Room Amount Rs	Brenials Quarters Quantity	Brenials Quarters Amount Rs	Qu
Excavation for Founds	5	%oo cft	751	4	1085	5	2
Concrete	18	%o "	606	109			
Masonry in Lime	25	%o "	1501	375	1834	459	3
do Mud	15	%o "	1544	232	5626	844	12
Wattle & Mud	4	%o sft	463	18			
Plastering in Lime	6	"	76	5			
do Mud	2/8/-	"	2,652	64			
Pointing	4	"	2,431	97			
Whitewashing	-/6/-	"	2,638	10			
Earth Filling	5	%oo cft	1,008	5			
Doors & windows glazed	1/4/-	sft	75	94			
do Baton	-/10/-	"	52	33	175	109	2
Arch Masonry in Lime	50	%o cft	22	11			
Woodwork in Roofing	1/8/-	cft	46	69			
Corrugated iron Roofing	40	%o sft	1,553	621			
Earth Flooring	5	%oo cft			2240	11	4
Roofing with Tiles	15	%o cft			2294	344	4
Latrine	10	1 unit					
Total				1747		1772	
Add Contingencies	5	%o		87		88	
Total Estimate				1834		1860	

rest Railway

3. Staff Quarters

li Station

li : 21 Miles

Out Buildings		Latrines		Total		Remarks
quantity	amount Rs	quantity	amount Rs	quantity	amount Rs	
233	1			2069	10	
				000	109	
393	98			3731	932	
1206	181			8376	1.257	
				463	78	
				76	5	
				2652	64	
				2431	97	
				2638	10	
				1008	5	
				75	94	
38	24			265	166	
				22	11	
				46	69	
				1.553	621	
480	3			2720	14	
492	74			2.786	418	
		4	40	4	40	
	381		40		3.940	
	19		2		196	
	400		42		4.136	

B. Tenant

Executive Engineer in charge

Kanara Fore

V Stations & Buildings

Hotelli

Raji Kanwri to Hotelli

Items	Rate Rs	Per	Running Room		Peons Quarters		C
			Quantity	Amount Rs	Quantity	Amount Rs	
Excavation for Founds	5	% c ft	751	4	1085	5	
Concrete	18	% "	606	109			
Masonry in Lime	25	% "	1,501	375	1837	459	
do Mud	15	% "	1544	232	5626	844	
Wattle & Mud	4	% sft	463	18			
Plastering in Lime	6	"	76	5			
do Mud	2/8	"	2,652	64			
Pointing	4	"	2,431	97			
Whitewashing	1/6	"	2,638	10			
Earth Filling	5	% c ft	1,008	5			
Doors & windows glazed	1/4	sft	75	94			
do Baton	1/10	"	52	33	175	109	
Arch Masonry in Lime	50	% c ft	22	11			
Woodwork in Roofing	1/8	c ft	46	69			
Corrugated iron Roofing	40	% sft	1,553	621			
Earth Flooring	5	% c ft			2240	11	
Roofing with Tiles	15	% c ft			2294	344	
Latrine	10	1 seat					
Total				1747		1772	
Add Contingencies	5	%		87		88	
Total Estimate				1834		1860	

...est Railway

3. Staff Quarters

...li Station

...li 21 Miles

Out Buildings		Latrines		Total		Remarks
...mber	amount Rs	number	amount Rs	number	amount Rs	
233	1			2069	10	
				606	109	
393	98			3731	932	
1206	191			8376	1.257	
				463	78	
				76	5	
				2652	64	
				2431	97	
				2638	10	
				1008	5	
				75	94	
38	24			265	166	
				22	11	
				46	69	
				1.553	621	
480	3			2720	14	
492	74			2.786	418	
		4	40	4	40	
	381		40		3,940	
	19		2		196	
	400		42		4.136	

B. Tavary

Executive Engineer in charge

Kanara Forest

Ragikumri to

V Stations

Abstract Cost of Stati

Items	Rate Rs	Per	Tanks		Pumps with piping		Points & Crossings	
			Quantity	Amount Rs	Quantity	Amount Rs	Quantity	Amount Rs
Tanks 5 ft Cube holding 800 Gallons with Staging	120	Each	10	1,200				
Pumps	550	"			4	2,200		
Points and Crossings	275	Set					16	4,400
Junction Signals	500	"						
Station Signals	50	Each						
Distant Signals	40	"						
Wells	1200	"						
Ash Pit	20	Cft						
Engine Shed	2	Sqft						
Total				1,200		2,200		4,400
Add Contingencies	5	o/o		60		108		219
Grand Total				1,260		2,308		4,619

rest Railway
to Potelli :- 21 Miles
ro & Buildings
tation Machinery.

Workings	Signals		Bells		Ash Pits		Engine Shed		Total	
Amount Rs	Quantity	Amount Rs	Quantity	Amount Rs	Quantity	Amount Rs	Quantity	Amount Rs	Quantity	Amount Rs
									10	1,200
									4	2,200
4400									16	4,400
	1	500							1	500
	2	100							2	100
	2	80							2	80
			2	2,400					2	2,400
					40	800			40	800
							1,200	2,400	1,200	2,400
4,400		680		2,400		800		2,400		14,080.
219		35		120		40		120		702
4,619		715		2,520		840		2520		14,782

S. Ismay
Executive Engineer in charge.

Kanara Forest

Ragikumri to

V Stations &

Abstract Cost of Stati

Items	Rate Rs	Per	Tanks		Pumps, with piping		Points & Crossings	
			Quantity	Amount Rs	Quantity	Amount Rs	Quantity	Amount Rs
Tanks 5 ft Cube holding 800 Gallons with Staging	120	Each	10	1,200				
Pumps	550	"			4	2,200		
Points and Crossings	275	Set					16	4400
Junction Signals	500	"						
Station Signals	50	Each						
Distant Signals	40	"						
Wells	1200	"						
Ash Pit	20	Cft						
Engine Shed	2	Sqft						
Total				1,200		2,200		4 400
Add Contingencies	5	o/o		60		108		219
Grand Total				1,260		2 308		4,619

...rest Railway

...to Potelli :- 21 Miles

...no & Buildings

...Station Machinery

...Platforms	Signals		Wells		Ash Pits		Engine Shed		Total	
Amount Rs	Quantity	Amount Rs	Quantity	Amount Rs	Quantity	Amount Rs	Quantity	Amount Rs	Quantity	Amount Rs
									10	1,200
									4	2,200
4400									16	4,400
	1	500							1	500
	2	100							2	100
	2	80							2	80
			2	2,400					2	2,400
					40	800			40	800
							1,200	2,400	1,200	2,400
4,400		680		2,400		800		2,400		14,080.
219		35		120		40		120		702
4,619		715		2,520		840		2520		14,782

...January

Executive Engineer in charge.

Kanara .T

Ragikumri (

V Stations and Buildings

Ragikumri

Items	Rate	Per	Tanks		Pumps with piping		Points & Crossings		Junction Signals	
			Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount
Tanks with Staging	120	Each	4	480						
Pumps	550	"			1	550				
Points & Crossings	275	1 Set					6	1650		
Junction Signals	500	"							1	500
Depôt Signal	40	Each								
Well	1200	"								
Ash Pit	20	Rft								
Engine Shed	2	Sqft								
Total				480		550		1650		500
Add Contingencies	5	o/o		24		27		82		25
Grand Total				504		577		1732		525

rest Railway——
Potelli . 21 miles——

4. Station Machinery

Station——

istant Signal		Well		ash Pit		Engine-Shed		Total		Remarks.
Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount Rs.	
								4	480	
								1	550	
								6	1,650	
								1	500	
40								1	40	
		1	1,200					1	1,200	
				20	400			20	400	
						1200	2,400	1,200	2,400	
40		1,200		400		2,400			7220	
2		60		20		120			360	
42		1260		420		2,520			7,580.	

S. P. Lemay
Executive Engineer in charge.

Kanara ...

Ragikumri to ...

V Stations and Buildings

Ragikumri ...

Items	Rate	Per	Tanks		Pumps with fitting		Points & Crossings		Junction Signals	
			Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount
Tanks with Staging	120	Each	4	480						
Pumps	550	"			1	550				
Points & Crossings	275	1 Set					6	1650		
Junction Signals	500	"							1	500
Depôt Signal	40	Each								
Well	1200	"								
Ash Pit	20	Rft.								
Engine Shed	2	Sqft.								
Total				480		550		1650		500
Add Contingencies	5	o/o		24		27		82		25
Grand Total				504		577		1732		525

vest Railway——
Potelli . 21 miles——

4. Station Machinery

Station——

Distant Signal		Well		ash Pit		Engine-Shed		Total		Remarks.
Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount Rs.	
								4	480	
								1	550	
								6	1.650	
								1	500	
1	40							1	40	
		1	1.200					1	1.200	
				20	400			20	400	
						1200	2.400	1.200	2.400	
40		1.200		400		2.400			7220	
2		60		20		120			360	
42		1260		420		2520			7,580.	

S. P. Swan
Executive Engineer in charge.

Kanara Fores

Ragikumri to Por

V Stations and Buildings

Crossing Stations at

Items	Rate Rs	Per	Tanks Quantity	Tanks Amount Rs	Pumps Quantity	Pumps Amount Rs	Points Quantity
Tanks with Staging	120	Each	2	240			
Pumps	550	"			1	550	
Points & Crossings	275	Set					3
Station Signal	50	Each					
Total				240		550	
Add Contingencies	5	%		12		27	
Total for 1 Station				252		577	
Total for 2 Stations				504		1,154	

...c Railway

...lli:- 21 Miles

4. Station Machinery

Cobural & Mahalingw.

Fencing	Station Signal		Total		Remarks.
Amount Rs	Quantity	Amount Rs	Quantity	Amount Rs	
			2	240	
			1	550	
825			3	825	
	1	50	1	50	
825		50		1,665	
41		3		83	
866		53		1,748	
1,732		106		3,496.	

B. Kenny

Executive Engineer in charge.

Kanara Forest

Ragikumri to Pole

V Stations and Buildings

Crossing Stations at

Items	Rate Rs	Per	Tanks Quantity	Tanks Amount Rs	Pumps Quantity	Pumps Amount Rs	Points & Crossings Quantity
Tanks with Staging	120	Each	2	240			
Pumps	550	"			1	550	
Points & Crossings	275	Set					3
Station Signal	50	Each					
Total				240		550	
Add Contingencies	5	%		12		27	
Total for 1 Station				252		577	
Total for 2 Stations				504		1,154	

...t Railway

...ell 21 Miles

4. Station Machinery

Cobural & Mahalingpur.

Crossings	Station Signal		Total		Remarks.
Amount Rs	Quantity	Amount Rs	Quantity	Amount Rs	
			2	240	
			1	550	
825			3	825	
	1	50	1	50	
825		50		1,665	
41		3		83	
866		53		1,748	
1,732		106		3,496.	

B. Ginnay

Executive Engineer in charge.

Kanara Forest ...

Ragkumr Potel...

V Stations and Buildings

Potelli Sta...

Items	Rate	Per	Tanks		Pumps		Points and Crossings		Dist...
			Quantity	Amount	Quantity	Amount	Quantity	Amount	Quan...
	Rs			Rs		Rs		Rs	
Tanks	120	Each	2	240					
Pumps	550	"			1	550			
Points & Crossings	275	Set					4	1,100	
Distant Signal	40	Each							
Well	1200	"							
Ash Pit	20	Rft.							
Total				240		550		1,100	
Add Contingencies	5	o/o		12		27		55	
Grand Total				252		577		1155	

Kailway——

Totelli 21 Miles——

321

4. Station Inachinery

Station ——

Distant Signal		Well		Ash Pit		Total		Remarks
Quantity	Amount Rs	Quantity	Amount Rs	Quantity	Amount Rs	Quantity	Amount Rs	
						2	240	
						1	550	
						4	1,100	
						1	40	
		1	1,200			1	1,200	
				20	400	20	400	
40		1,200		400		3530		
2		60		20		176		
42		1260		420		3,706		

S. Kenaway

Executive Engineer in charge

Kanara Forest ...

Ragkumri to Potel...

V Stations and Buildings

Potelli Sta...

Items	Rate	Per	Tanks		Pumps		Points and Crossings		Dist...
			Quantity	Amount Rs	Quantity	Amount Rs	Quantity	Amount Rs	Quan...
Tanks	120	Each	2	240					
Pumps	550	"			1	550			
Points & Crossings	275	Set					4	1,100	
Distant Signal	40	Each							
Well	1200	"							
Ash Pit	20	Rft.							
Total				240		550		1,100	
Add Contingencies	5	%		12		27		55	
Grand Total				252		577		1155	

x Railway——

Totelli 21 Miles——

4. Station Machinery

Station ——

Distant Signal		Well		ash Pit		Total		Remarks
quantity	Amount Rs	quantity	Amount Rs	quantity	Amount Rs	quantity	amount Rs	
						2	240	
						1	550	
						4	1,100	
40						1	40	
		1	1,200			1	1,200	
				20	400	20	400	
40		1,200			400		3,530	
2		60			20		176	
42		1260			420		3,706	

P. L. Kenny

Executive Engineer in charge.

Kanara Forest Railway

Ragikumri to Kotelli : 21 Miles

VI Plant Engineering

Items	Rate	Per	Quantity	Amount	Total.
Tools					
Platelayers Tools	250	Set	7	1.750	
Material Trollies	300	Each	10	3.000	
Passenger Trollies	200	"	2	400	
Total Tools					5.150.
Instruments					
Drawing Boards	5-8-0	Each	2	11	
Chains 100 ft	6-3-0	"	4	25	
Prismatic Compass	60/-	"	1	60	
Levels	162/-	"	2	324	
Theodolite	400/	"	1	400	
Levelling Staves	42-8-0	Set	3	12.8	
Curve Box	16/-	Each	1	16	
1st Class Instrument Box	56/-	"	1	56	
2nd do do	34	"	1	34	
Circular Protractor Brass	62	"	1	62	
Straight Edges	10	Each	2	20	
Scale Boxes	10	"	2	20	
Rulers 2 feet	22-8	"	2	45	
Squares Mahogany with Ebony Edge	18/-	L.S.	10	18	
Record for Curves	1-8-0	Set	2	3	
Tapes 100 ft	5/-	Each	10	50	
Umbrellas Field	10/-	"	3	30	
Stencils	20/-	Set	1	20	
Total Instruments					1.321
Camp Equipage					
Hill Tent	250	Each	1	250	
Kowties	60	"	10	600	
Total Camp Equipage					850.
Total					7.321
Add Contingencies	5	%			366.
Grand Total					7.687.

Executive Engineer in charge

Kanara Forest Railway

Ragikumri to Potelli : 21 Miles

VI Plant

4. Station and Office Furniture

Items	Rate Rs	Per	Construction Office Quantity	Construction Office Amount Rs	Running Room Quantity	Running Room Amount Rs	Total Quantity	Total Amount Rs
Drawing Table	20	1	1	20			1	20
Pigeon Holes	6	1	2	12			2	12
Iron Safe	50	1	1	50			1	50
Wooden Chests	10	1	2	20			2	20
Office Table	25	1	1	25			1	25
Clock	15	1	1	15			1	15
Despatch Box	15	1	1	15			1	15
Punkah	5	1	1	5			1	5
Record Box	5	1	2	10			2	10
Chairs	5	1	10	50	4	20	14	70
Crockery	35	Set			1	35	1	35
Cooking Vessels	25	"			1	25	1	25
Dining Table	20	1			1	20	1	20
Benches	1	1			4	4	4	4
Commodes	5	1			2	10	2	10
Looking glass	3	1			1	3	1	3
Small Table	4	1			2	8	2	8
Cots	5	1			2	10	2	10
Lamps	15	1			1	15	1	15
Lyndies with Stand	4	1			2	8	2	8
Almurah	10	1			1	10	1	10
Bath tubs	5	1			2	10	2	10
Total				222		178		40
Add Contingencies	5	%		11		9		2
Total Estimate				233		187		42

S. Fenard
Executive Engineer
in charge

Kanara Forest Railway

Rajikurvi to Potelli : 21 Miles

List of Establishment

Period — 1½ years.

No.	Class of Officers	Rate of pay	Amount	Total — Cost per annum	Total for Completion of Railway	Remarks.
	Direction and Audit					
	Direction and audit					
	Office charges	200	200	2,400	3,200	
	Total Direction and Audit		200	2,400	3,200	
	Engineering					
	Construction					
	Executive Engineer 4 Grade	600	600	7,200	9,600	
	Total		600	7200	9,600	
	Overseer 1st Grade	100	100	1,200	1,600	
	Total		100	1,200	1,600	
2	Sub-Overseers 1st Grade	50	100	1,200	1,600	
	Total		100	1,200	1,600	
	Total Construction		800	9,600	12,800	
	Office					
1	Accountant 4th Grade	115	115	1,380	1,840	
1	Head Clerk	60	60	720	960	
1	Clerk	40	40	480	640	
1	"	30	30	360	480	
1	Draftsman	60	60	720	960	
1	Munshi	20	20	240	320	
1	Cashier	55	55	660	880	
1	Sub-Store Keeper	40	40	480	640	
1	Peon	10	10	120	160	
2	"	9	18	216	288	
	Total		448	5,376	7,168	
1	Hospital Assistant 2nd Class	35				
	Charge allowance	15	50	600	800	
1	Servant	9	9	108	144	
	Total		59	708	944	
	Total Office		507	6,084	8,112	
	Travelling allowance		200	2,400	3,200	
	Contingencies		150	1,800	2,400	
	Total Engineering		1,657	19,884	26,512	
	Grand Total		1,857	22,284	29,712	

B. Finnay

Executive Engineer in charge

Office of Executive Engineer in charge
Kanara Forest Railway Survey

No. 201.

Dated Haliyarmachi 24th Sept/1888

To

The Consulting Engineer
for Railways
Bombay.

Project for Kanara Forest Railway—
Ragkumri to Potelli — 21 Miles.

Sir

In Compliance with your No. 435 dated 19th January/88, I have the honor to forward the following papers in connection with the Project for this Railway.

1_Report
2_Estimates
3_Financial Forecast Tables I II III & IV. (with Report)
4_Plans in portfolio-Containing 13 Tracings
1 sheet Index Plan & Section
7 do Plan & Section
3 do Cross Sections
1 do Types for Bridges
1 do Types for Stations & Buildings &
5_Forms A to K and M.

Office of Executive Engineer in charge
Kanara Forest Railway Survey

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1 do Type for Bridges
1 do Type for Stations & Buildings &
5_Forms A to K and M.

10772 A.

I have the honor to be

Sir,

Your Most Obedient Servant

B. Swan,

Executive Engineer in charge

Kanara Forest Rs Surveys

Kanara Forest Railway.

Raghavapur to Potelli 21 Miles

Forms A to K and M.

Kanara Forest Railway

Ragkumru to Potelli :- 21 Miles

FORMS A. & B.

List of Curves and Gradients. It is not necessary to give a "complete" list of curves and gradients, but simply an abstract under different classes. For the sake of uniformity, the classes given below should be adoped on all State Railways.

Form A

No	Radius of Curves &c	Length Miles
	300 feet	
38	Above 300 to 400 feet inclusive	2 29
3	„ 400 „ 500 „	0 29
21	„ 500 „ 600 „	1 03
10	„ 600 „ 1,000 „	0·58
16	Above 1,000	1·20
	Straight line	8·46
	TOTAL	13·85

Form B

No	Gradients.	Length, Miles.
	1 in 30	
49	Above 1 in 30 to 1 in 50 inclusive	8·27
6	„ 1 „ 50 „ 1 „ 80 „	0·76
1	„ 1 „ 80 „ 1 „ 100 „	0·18
5	„ 1 „ 100 „ 1 „ 150 „	0·78
1	„ 1 „ 150 „ 1 „ 300 „	0·17
	„ 1 „ 300 „ 1 „ 1,000 „	
	Above 1 in 1,000	
	Level.	3·68
	TOTAL	13·85

B.—The distance from Mahalingee to Potelli (9 M. 7.15 Miles) to be added to the above total as that portion of the line on this route was not surveyed this season, but from knowledge obtained by prospecting the average of Curves &c. for the first 13 85 Miles may be taken for the Mahalingee - Potelli portion

All curves, below the minimum of 300 feet radius, and all gradients below the minimum of 1 in 30, must be specially noted in addition to the above forms.

Hazarmachi
24th Sept. 1909

S. Ganay
Executive Engineer-in-Charge

FORM C.

LIST OF BALLAST.

Position	Length, Miles	Character of Ballast
M M Between and		
	Nil	
Total....		

B. Kinsey
Executive Engineer-in charge

339

FORM D.

LIST OF IMPORTANT WATERWAYS.

Name of River.	Position, mile.	Drainage area, square miles	Rise of flood water above low water level.	Declivity of bed, feet per mile.	Maximum velocity in flood, feet per second.	Openings proposed.					Character of foundation.	Remarks.
						No.	Clear spans	Flood area, feet.	Flood discharge, feet per second.	Value of K*		
							Nil					

*Value of K in the formula Log K=Log D—¾ Log M, where D=Total discharge of the river in extreme flood in feet per second.

M=drainage area in square miles

K=Co-efficient of Colonel Dicken's formula.

Executive Engineer in charge

FORM E.

ABSTRACT OF WATERWAYS.

Clear Spans.	Total Area of Waterway.	..... per Mile of Railway.	Remarks.
In Culverts and Bridges not exceeding 10 feet clear span	—	—	In lieu of Culverts Boulder Pitching carefully packed to admit of drainage passing through has been provided at all necessary places.
In Culverts and Bridges exceeding 10 feet, but not exceeding 20 feet clear span	6.25.214	44.758	
In Culverts and Bridges exceeding 20 feet, but not exceeding 40 feet clear span			
In Culverts and Bridges exceeding 40 feet, but not exceeding 60 feet clear span . ..			
In Bridges exceeding 60 feet clear span .			
TOTAL	6.25.214.	44.758	

S. Fenary

Executive Engineer-in-charge.

343

FORM F.

ABSTRACT COST OF LARGE BRIDGES.

Name of River, &c.	Position, mile	Openings.		Height of underside of Girders above flood level river bed, and above underside of footings	Estimate Cost in Rupees.			Remarks.
		Number.	Clear Span.		Piers and Abutments including Foundations.	Superstructure without Rails and Sleepers	Total.	
					Nil			

B Genais
Executive Engineer In charge

345

FORM G.

LIST OF STATIONS.

Name.	Class.	Position, Mile.	Distance Apart. Station to Station	Distance Apart. Of Engine Stations.	On what Gradient.	On what Curve.	Total Estimated Cost.	Remarks.
Rajakumri	3rd	0		Rajakumri is the Starting Station, the line is to be worked from that Station with Engines hired from the Southern Mahratta R'y Coy.	Level	Straight	567	
Cobural		7	7		Level	Straight	Nil	Crossing Station
Mahalingpur		13 4/5	6 4/5		Level	Straight	Nil	Crossing Station
Potelli		21.	7 1/5				Nil	Terminus Station
								No Stations and offices required.
		Average..	7			Total..	567.	

S. Pinnell

447

FORM H.

LIST OF STATION MACHINERY, &c.

Name of Station.	Number.														
	Tanks.	Pumps.	[illegible]rs.	Hydrants.	Points.	Crossings.	Station Signals.	Distant Signals.	~~Traversers.~~ Ash Pit	~~Carriage~~ Turn tables. Engine Shed	~~Engine~~ Turn tables. Well	Weigh-bridges.	Weighing Machines.	Cranes.	Dating Presses.
Ragikumri	4	1			6	6	1	3	1	1	1				
Cobural	2	1			3	3	1								
Mahalingpur	2	1			3	3	1								
Kotelli	2	1			4	4		1	1		1				
Total Number...	10	4			16	16	3	4	2	1	2				
Average number per 100 miles of Railway...	48	19			76	76	14	19	10	5	10				

S. Pearce
Executive Engineer Tharwar

349

FORM I.

LIST OF STATION BUILDINGS.

Name of Station.	~~Passenger~~ Station Ma. Number of Units	~~Loding~~ & other ea in uares.	Goods Shed Length.	Breadth	Area	Pointsman's Huts. No.	Area	Latrines. No of Units	Area.
Ragkumri	1	94				14	1,400		
Cobural						2	200		
Mahalingee						2	200		
Totelli						14	1,400		
Total	1	94				32	3,200		
Average per 100 miles of Railway	4·76	24				152.40	15,240		

B. Hennay
Executive Engineer in charge

FORM. J.

LIST OF STAFF QUARTERS

NAME OF STATIONS.	1st Cla Houses	Running Room European Quarters.		Clerks' Quarters.		Native Quarters.		Out-Buildings.		Latrines.		Port. Way Inspectors Quarters		Guards & Drivers Qrs		Station Masters Qr.		
	No. of Units	No. of Units	Area Squares	No. of Units	Area Squares	No. of Units	Area Squares	No. of Units	Area Squares	No. of Units	Area Squares	No. of Units	Area Squares	No. of Units	Area Squares	No. of Units	Area Squares	
Yagikumri								10	10	7	2·1	2	4·34	8	17·36	4	6·20	
Rural										2	0·6							
Nahalungee										2	0·6							
Telli		1	6·27					3	3	4	12							
		1	6·27					13	13	15	4·5	2	4·34	8	17·36	4	6·20	
Average per 100 Miles of Railway.		4·76	2·98					61·9	61·9	7·143	2·143	9·52	20·67	38·08	82·68	19·04	29·52	
Average cost per square of Building.		Rs 292·5						Rs 133·1		Rs 33·3		Rs 336·9		Rs 336·9		Rs 294·2		

S. Pearson
Executive Engineer - M. & L. Ry.

FORM J.

LIST OF STAFF QUARTERS.

NAME OF STATIONS	1st Class Houses		Running Room European Quarters		Clerks' Quarters		Native Quarters.		Out Buildings		Latrines		Port: Wap Inspectors Quarters		Guards & Drivers Qrs		Station Masters Qrs			
	No. of Units	Area Squares	No of Units	Area Squares	No of Units	Area Squares	No of Units	Area Squares	No of Units	Area Squares	No of Units	Area Squares	No of Units	Area Squares	No of Units	Area Squares	No of Units	Area Squares		
Ragikumri									10	10	7	2·1	2	434	8	1736	4	620		
Cobural											2	06								
Mahalingee											2	06								
Potelli			1	627					3	3	4	12								
TOTAL.....			1	627					13	13	15	4·5	2	434	8	1736	4	620		
Average per 100 Miles of Railway.			476	2988					619	619	7143	2143	952	2067	3808	8268	1904	2952		
Average cost per square of Building.			~~Rs~~ 292·5						~~Rs~~ 133·1		~~Rs~~ 333		~~Rs~~ 3369		~~Rs~~ 3369		~~Rs~~ 294·2			

Executive Engineer-in-charge

FORM. J.

LIST OF STAFF QUARTERS.

NAME OF STATIONS.	1st Class Houses		European Quarters.		Clerks' Quarters.		Native Quarters.		Out-Buildings		Latrines.		Ast. Way Inspectors Quarters		Guards & Drivers Qrs		Station Masters Qr.		
	No. of Units	Area Squares	No. of Units	Area Squares	No. of Units	Area Squares	No. of Units	Area Squares	No. of Units	Area Squares	No. of Units	Area Squares	No. of Units	Area Squares	No. of Units	Area Squares	No. of Units	Area Squares	
Ragikumri									10	10	7	2·1	2	434	8	1736	4	620	
Cobural											2	0·6							
Mahalungee											2	0·6							
Potelli			1	6·27					3	3	4	1·2							
TOTAL.....			1	6·27					13	13	15	4·5	2	434	8	1736	4	620	
Average per 100 Miles of Railway.			4·76	29·85					61·9	61·9	71·43	21·43	9·52	20·67	38·08	82·68	19·04	29·52	
Average cost per square of Building.			Rs 292·5						Rs 133·1		Rs 33·3		Rs 336·9		Rs 336·9		Rs 294·2		

Divisional Superintendent

FORM K.

LIST OF LEVEL CROSSINGS.

	Description of Level Crossing,	Number.	Average No. per 100 miles.	Remarks.
A.	With gates closing across the Railway, and with huts			
B.	With gates not closing across the Railway, but with huts...	2	10	
C.	Level Crossings without huts...			
	Huts for Maintenance Gangs	40	190.	

Executive Engineer in charge.

FORM M.

ABSTRACT LIST OF ESTABLISHMENT.

Class of Officers	No	Average Rate of Pay	Average Rate of Travelling Allowances.	Average Rate of Sundries	Average Rate of Total.	Total Cost per Annum	Number of years.	Total for completion of the Railway.	Average Cost per 100 Miles. Per Annum	Average Cost per 100 Miles. Total
Direction and Head Office Charges		200			200	2 400	1⅓	3.200	11.429	11.429
Executive Engineer 4th Grade	1	600	100	100	800	9,600	"	12800.	45,716	60,574
Overseer 1st Grade	1	100	30		130	1,560	"	2,080	7.429	
Sub Overseers 1st Grade	2	100	30		130	1560	"	2,080	7.429	
Accountant 4th Grade	1	115			115	1380	"	1,840	6571	34,115
Clerks	4	150	8		158	1,896	"	2528	9.029	
Cashier	1	55	15		70	840	"	1,120	4,000	
Sub Storekeeper	1	40			40	480	"	640	2,286	
Draftsman	1	60			60	720	"	960	3.429	
Hospital Assistant Second Class	1	50	15	50	115	1,380	"	1,840	6.571	
Peons	4	37	2		39	468	"	624	2 229	

B Conway
Executive Engineer in Charge

Regr Nos 742A, 551/4

743A & 744A.

Submitted for

orders.

M

7.3.89

Please put up POs

Col. Peyton's original report

&c- JM 11/3

11/3

All the F.P. including

Col. Peyton's original report

will be found in cover

798/88 herewith put up

MM 11/3

M

11.3.89

I feel it very difficult to arrive at any conclusion from Mr MacGregor's report. His judgment is somewhat diminished by his persistent recurrence to the 24" rails principle & the line on Hellyer which have been thoroughly discussed & found wanting. I cannot go so far as Mr Coghlan Judge. Vol Register notes of 1st July/88 repeats his previous statement that the line from Rapparoller could go through pine forest full of marketable produce the whole way, Mr MacGregor seems to think that there would be an average lead of 6 or 7 miles (para 2.7).

Norman Creek waits to hear Bullock's views to go out first for the Olaria line and not until then the steam power rails could carry any traffic

-fict. basing his estimate
on forecast not at the
present existing output
per man. He considers that
it is not so much a question
of bringing new tracts
into working as of
cheapening the transport
of wood from areas which
can be worked by means
of carts". I had always
supposed that the main
object was eventually to
get out produce which
could not be got at by
any existing roads (p. 4)
He returns to this objection
that cutting should not be
increased unless we are
sure that this can be done
without trenching on
capital (p. 3) But first
it has been assumed that
the output is to be in-
creased by making access
ible new sources - &
secondly - If it was asked

in Nov.r/89 to submit
a "working plan of the
forests on the proposed
line - This was not done
even in the months of
the Hon Bd which only
called for an estimate,
but it is strange that
we cannot yet venture
~~to~~ an opinion whether
the line could safely
carry out more than we
can do now
He has not apparently
considered the question
of increased demand the
cheapened transport, he
only says that our coals
now meet Burma coals
in some of the markets
Burma coals must have
borne a great many more
miles of Rail carriage
(besides sea voyage) than
any Canada coals in the
markets referred to - In
'moral w: men' the line
we should push our
trade for Canada and

smaller profits on a larger business – the business will be increased by opening new areas instead of this will do. So far as he makes any estimate makes one to them only the savings on the average rates of recent years (i.e. before the War Railway) to be made by cheaper transport. I cannot say why he selects 27 & 15 miles as the lead in each case nor whether the 7 miles distance of the Depot at Ballyal from Almaza station should be added for cost of the produce, but his last sentence will imply that there was no scale within 27 miles of Rosarvalle except poles, which is rather hard to believe. However I suppose we may take it that railway transport will certainly not cost more than 1/8 of

Cart carriage when the Railway is worked up to its full capacity or nearly; if however instead of 25,000 tons it is to carry only 5,000 it is plain that the cost would be very considerably more than ½ of cart transport & that it would hardly be worth while to make a Railway for such a small duty - The question therefore comes to turn upon the prospect of export of firewood, rambroos, & sleepers - & the increase of the general demand so as to bring the output more nearly up to the estimate of Col. Peyton. It is not easy to decide "when doctors disagree" but I am not prepared to condemn the projection

In Mr. Macgregor's estimate of the yield of the forest or of the demand at reduced prices of teak rolls at Sadap at Rs 57-11 (see Daily note of 16/6 in No 230 of 87) & it costs us Rs 12-8 at the depot, I do not see why we should estimate for Rs 64 (even if we have been selling small quantities at Rs 78) provided we can get enough to make the larger output pay without entrenching on capital.

I would forward Mr Macgregor's letter with my remarks upon his estimates in the list

of my criticisms above. He should consult all authorities available. Mr Macy should be asked whether he is now in a position to furnish an estimate of the yearly capability of the forests near the proposed line. Col. Pullan may be asked whether the T. Survey has surveyed the country between Hullyal & Koppa near the proposed line & if so when maps will be ready.

JM 12/3

13/3

U. O. No. 1998 d

13-3-89

To the P. W. Deptt.

1/4 ~~12~~ 6

13/3

4 - 35

Re-transferred

unofficially to the

Public Works Deptt.,

Railway; with a re-

quest that the papers

may be transferred

officially to this Deptt.

Chief Secy. to
Govt.

MW
13/

Wn. U. O. No. 1998
13-3-89

Do to.
No.
14/3

Sec.

Gl. O. No. 1998 g

13-3-89

To Asstt. M. Highway.

Hurb

13/3

4-35

Re. transferred

unofficially to the

Public Works Depm.

Railways, with a re-

quest that the papers

may be transferred

officially to this Dept.

Chief Secy. to
Govt.

13/3

Nom. Genl O. No 1998
13-3-89

Do so.
No.
14/3

Sec

Recd 14/3/89 864 A.

No 592 of 1889.
Public Works Department,
(Railways)
Bombay Castle, 14th March 1889.

Transferred accordingly.

H. W. Sanders
Under Secretary to Govt.
bg

RECD
MAR 14
1889

Earl
4.50 p.m.

To

The Secretary to Govt.
Revenue Departt.

5647

Kaiwarra Tramway

Transfer from the Public Works Department (Railways) No 522, dated 14th March 1899.

Subd with necessary draft orders in reference to the Hon: Mr Richey's minute dated the 12 - inst written.

WW 15/3

WOM

8624.

No. 2159 of 1889.

R. D

B. C., 20th March 1889

To

The Commr. S. D.

Sir,

I am directed to forward herewith the papers noted on the margin on the subject of the proposed Kamara Forest Railway & to request that you will be good enough after consulting all the

Copy of Govt. letter No. 777 of 21 Nov. 1888 & accompaniments.
Report by the Conservator of Forests, S. C., No. 4, 7 & 8 of 19 Dec. 1888, in original (to be returned)
Copy of a minute by the Hon. Mr. Rechey of 12 March 1889

the available authorities, to favour Lord with your remarks on the estimates submitted by Mr. MacGregor in the light of the criticisms passed thereon by the Hon. Mr. Richey. I am at the same time to forward for your information a copy of the Railway Dept. note, dated 16 June 1887, referred to in the Hon: Mr. Richey's minute, & to state that Lord

Peyton's

Pejtou's note of July 1888 also referred to therein was subd to Govt with your letter No 3188, dated 16 Octr 1888.

2/3 I have, &c.,

Minister

Secy to Govt

15/3

Note to be made that it was observed to him on visiting the Home on 12-3-89 the Governor's Telegram.

"LHA"

No. 216 of 1889

R.D

B.C., 20th March 1889

Memo.

The undersigned presents compliments to the Comr. of Forests, B.C., & with reference to that officer's letter No. H 5 5 0, dated 25 Jany 1888, is directed to request that he will be good enough to report for the information of Govt. whether

whether he is now in
a position to furnish
an estimate of the
yearly capability of
the forests near the
proposed line of the
Mysore Forest Railway

[redacted] to
Govt

MW 1573
WDM 20/3

864.

No. 2161 of 1887.

R. D.

B. C., 20th March 1887

To

The Survey & Settle-
-ment Comm^r

Sir,

I am directed
to request that you
will be good enough
to ascertain & report
for the information
of Govt whether the
Forest Survey has
surveyed the country
between Halifax & Bufa
near

near the line of the proposed Kaiwara Forest Railway recently surveyed by Mr. Gerrard, Executive Engineer on special duty, & if so, when maps will be ready. I have &c.,

Hunt.
Chief Surveyor

NW 1573

No 3658 of 1888/89.
Alibag Kolaba Distrct
29th March 1889.

From.

The Conservator of Forests
Southern Circle.

To

The Under Secretary to
Government Revenue
Department Bombay

RECD
APR. 1
1889.

Sir.

In reply to Government
Memorandum No 2160 of the
20th instant I have the
honor to report that the
is shall a good deal
field-work to be done
which will occupy the
working plans staff
up to the end of the

near the line of the
proposed Kawara Forest
Railway recently sur-
veyed by Mr Ferrard,
Executive Engineer on
special duty, & if so, when
maps will be ready. I have &c

Chief Secy to
Govt

1 Encl
15/3

15/3

No 3655 of 1888/89.
Alibag. Kolaba Distrct
29th March 1889.

From

The Conservator of Forests
Southern Circle

To

The Under Secretary to
Government, Revenue
Department, Bombay

Sir,

RECD
APR. 1
1889

In reply to Government
Memorandum No. 2160 of the
20th instant, I have th
honor to report that th
is shall a good deal
first-work to be done
which will occupy th
working plans staff
up to the end of the

near the line of the
proposed Navan Fort
Railway recently sur-
veyed by Mr. Gerrard,
Executive Engineer on
special duty, & if so, when
maps will be ready. I have &c.,

Secretary

NW 15/3

2/13

No 565 of 1888/89. 379.
Alibag. Kolaba District.
29th March 1889.

From.

The Conservator of Forests
Southern Circle

To

The Under Secretary to
Government Revenue
Department. Bombay

RECD
APR. 1
1889

In reply to Government
Memorandum No. 2160 of the
25th Instant, I have the
honor to report that th
is still a good deal
field-work to be done
which will occupy th
working plans part
up to the end of the

rec'd 1-4-89 1036 S

working season. The
calculations have then
to be made from the
field-data, and cannot
probably be completed
until the end of September
next. The estimate of
sustained yield, could
therefore, in all probability
be furnished by the 15th
April. [illegible] it
it would be possible to
get the work finished
sooner, but every effort
will be made to do it
quickly.

I have the honour to be,
Sir,
Your most obed't Servant
Gifford Pinchot
Conservator of Forestry &c.

381.

Survey of India Department

No. 121

From

The Officer in charge

No. 17 Party (Bombay Forests)

To,

The Survey Commissioner Bombay

Camp via Post Office Lanowla

Dated Khuchi 31st March 1889.

With reference to the Survey Commissioner's No. 590 dated Bombay 23rd March 1889 the undersigned has the honor to inform him that Mr. Lawson in charge of the Ratnagiri Survey states that the Survey of the country between Malegaon and Lupa is in progress and will be completed this season if possible

sd/ A. Pullan Col. S.C

Sup't Bombay Forest Survey

No. 657 of 1889

Mahabaleshwar 3rd April 1889

Copy

RECD APR 5 1889

ad 5-4-89. 1121/88/3 &c
copy forwarded to the Under
Secretary to Government Revenue Departt
with reference this letter No. 2161 dated 1st
of the ultimo -

Surveyor Commissioner

10364
11214

Forests. South Kanara Forest Railway

(Vide Dockets within)

Letter from the Conservator Forests, N.C., No 5653, dated 29th March 1889:-

(Print in full)

Memorandum from the Survey & Settlement Commissioner No 657, dated 3rd April 1889.

Forwarding with reference to Government letter No 261, dated 20th March 1889, copy of the following letter No 124, dated 31st Ultimo, from the Officer in charge No 17 Party (Bombay Forests):-

(Here print the letter)

Submitted.

The receipt of the reply
of the Commissioner, L.D.
to Government letter No 2159,
dated 20th March 1889, may
awaited.

Ag. Ms. Secy. 20/3

No. 1902 of 1889

From,

J. R. Middleton Esquire
Acting Commissioner S.D.

To

J. Sargent Esquire
Chief Secretary to Government
Revenue Department

RECD JUN: 19 1889

Sir, Poona 15th June 1889

I have the honour to submit the report called for in your letter No. [redacted] d/d 20th March [redacted] the subject of the proposed Kanara Forest Railway. The report by the Conservator of Forests received with your letter is herewith returned. A map of the Supa Talukas and of the Southern Maratha Railway near it is also appended.

2. The line advocated by Mr. Hare-gregor is from Alnavar or Kumbhar-gaonvi station to Haliyal which is the present Forest Depot and thence to Mayna

on the Kalinadi. Beyond the river it would go south towards Jâmbga towards Khanapoli croping the intervening range of hills by a pass. As this line has been finally disapproved of by Government it needs not be considered.

3. The line advocated by Colonel Taylor and selected by Mr. Gerard starts from Nagargali station on the Southern Maratta Railway. The gradients near Nagargali are very steep and Mr. Macgregor suggested a place called Rajekumeri (where there is no village or station), because the gradients would not be so difficult. The question of the best starting point however, is entirely an engineering one and in a Forest point of view Nagargali is as good as Rajekumeri.

4. From Nagargali the line goes down

down the left bank of the Birchi nallah to Kunchbarkop and cropping the Kalishadi road parallel to the road to Potali or Paitali as it is spelt in the map. Beyond this village it was not surveyed, but it is supposed to be feasible to continue it round by Aborda to the Jeund plateau or towards Maindurli on the east of the Koneri nullah which flows through a deep valley with precipitous slopes and scarps which the Railway could not be taken. For the present the Railway may be assumed to go as far as Potali only.

5. Mr. MacGregor accepts colonel Peyton's estimates of log teak and raises the price. These figures may be kept.

6. For Jungle wood he takes the

time, greatly, but reduce the price from Rs 48 to 40 per ton, because the quantity is three times larger than ever has been sold. This reduction must, I think, be allowed, though in time the price would probably rise again as demand for the wood sprung up in more distant markets

7. Col: Peyton's estimates for Blackwood and teak poles has been accepted

8. Mr Macgregor leaves out sleepers altogether in the estimate in para: 5 of his letter, although in para: 22 he accepts Colonel Peyton's estimate. The estimate is, I think, over sanguine, but there is every reason to anticipate a large and continued demand for sleepers.

9. As regards bamboos, Col: Peyton's

Taylor's estimate is excessive. Bamboos are cut in the hot weather when cultivators have little work for their bullocks in their fields. Carts hire to there cheap and the cartmen go into the jungles, cut bamboos and cart them direct to where they are wanted. Dharwar, Hubli, Belgaum and the country around these towns are supplied in this way and for such short distances the railway cannot compete with carts because, to the Railway carriage must be added the cost of carriage from the jungle to the Railway and again from the Railway to the place where they are required. There is however every probability of a large demand springing up for bamboos in distant markets which

can be reached by the railway and although, this demand can be partly met from the forests within 8 or 10 miles from the present Railway, it would eventually be necessary to go into the more distant forests, which the proposed Railway would tap. Col: Peyton's estimate is much too high, but Mr. Macgregor errs, I think, on the side of caution in allowing nothing on account of bamboo

2. As regards firewood, the demand for which is confined practically to the Southern Maratha Railway, the sole question is whether it can or cannot be supplied from the forests through which the Southern Maratha Railway passes. Col: Peyton considers that it cannot. Mr. Macgregor on the other hand considers that properly

arranged cuttings within five miles of the present Railway can supply all wants. These cuttings would have to be worked by a light moveable tramway for bullock power, and as the firewood would be near the Railway, the cost of carriage would be less than from the more distant forests, which the forest Railway would tap. It is true that for some years the forests opening the forest Railway for the first few miles would supply all that was required, but eventually the distance from which the wood had to be brought would be greater unless a bullock tramway was used to feed the forest railway.

The immediate advantage therefore, of the forest Railway as

can be reached by the railway and although, this demand can be partly met from the forests within 8 or 10 miles from the present Railway, it would eventually be necessary to go into the more distant forests which the proposed Railway would tap. Col: Peyton's estimate is much too high, but Mr Macgregor errs, I think, on the side of caution in allowing nothing on account of [illegible]

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arranged

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The immediate advantage therefore of the forest Railway as

regards firewood is small, although it would be essential, if the required quantity of firewood cannot be got near the Southern Maratha Railway.

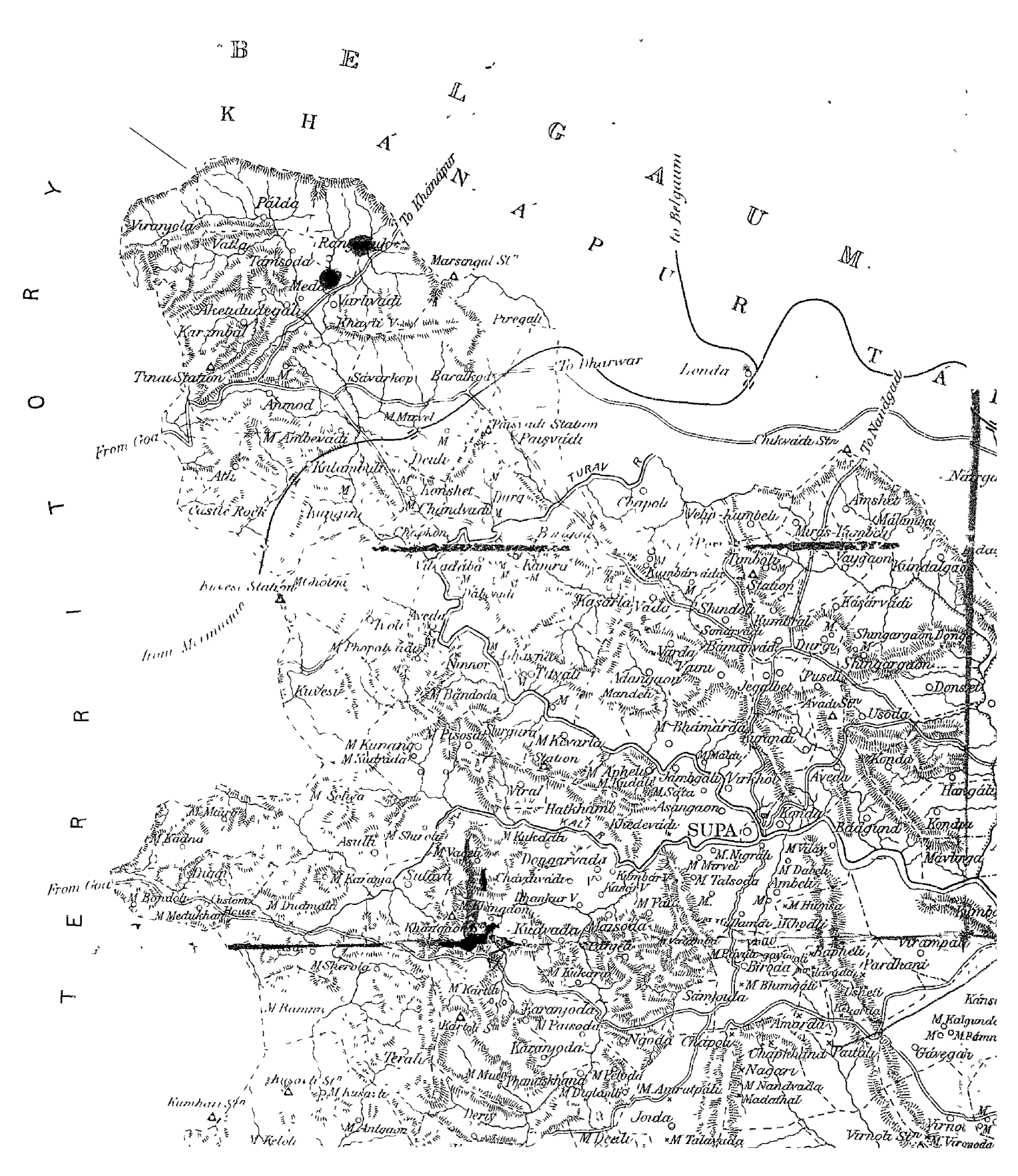
11. Mr. Macgregor is correct in saying that the question is not about opening up new tracts inaccessible by roads, but about cheapening the transport from tracts already worked. The finest teak grows on the Gund plateau which is extremely difficult of access from the north and east. The plateau however, has been worked for years by floating the timber down the Kaveri and Kali-nadi, but the prices obtained are much higher above the ghauts than on the east. All the other forests mentioned in the correspondence are already worked

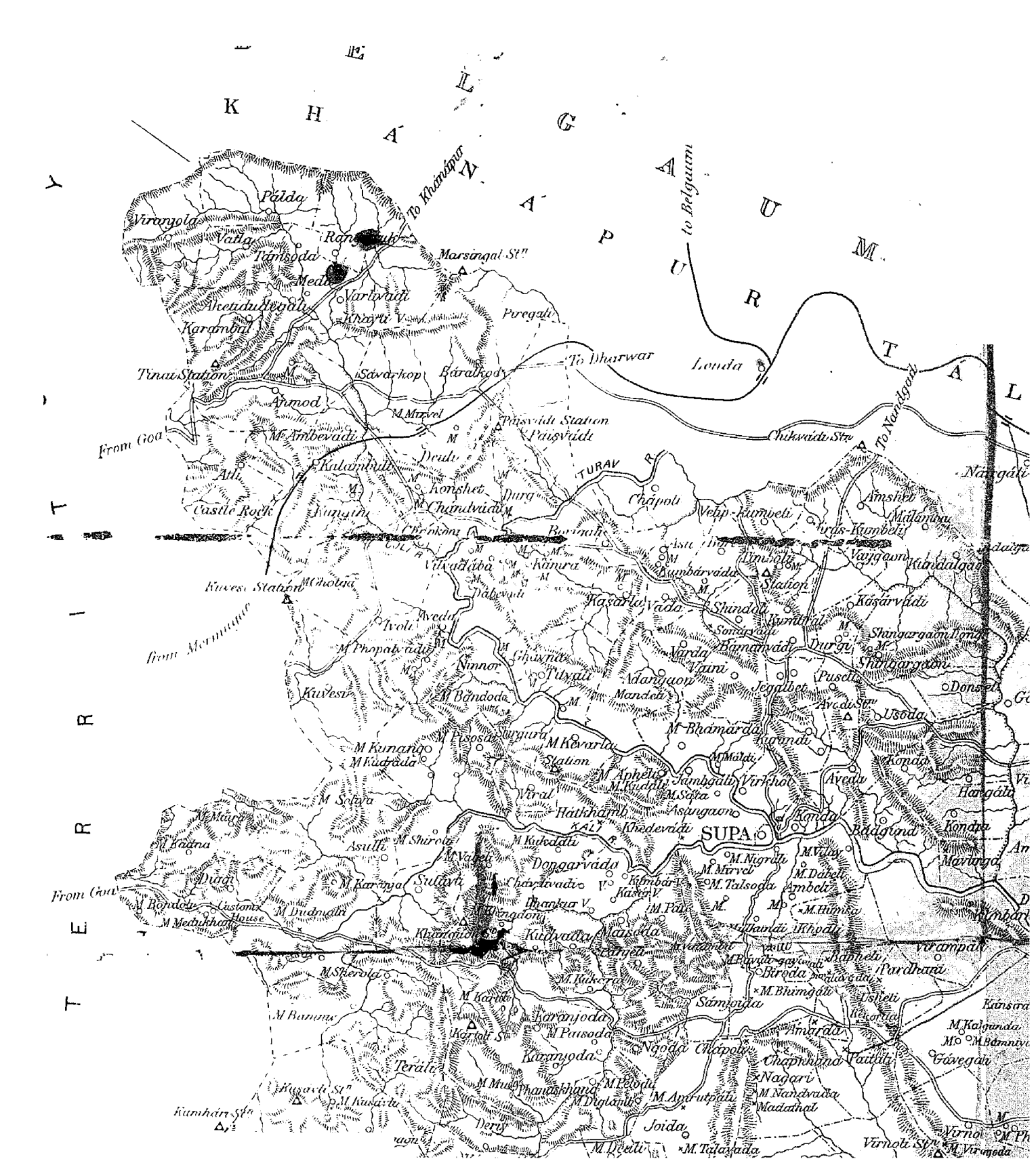
worked by road to Kalijal Depot. If the Railway is extended beyond Potali in the direction of Sund, the large supplies on that plateau may be brought to the Dharwar market.

12. I have seen the forests and have consulted Col: Peyton and Mr. Macgregor and obtained all the local information available. The data however, are so uncertain that it is difficult to form a decided opinion, but with the modifications made above the estimates may I think, be accepted.

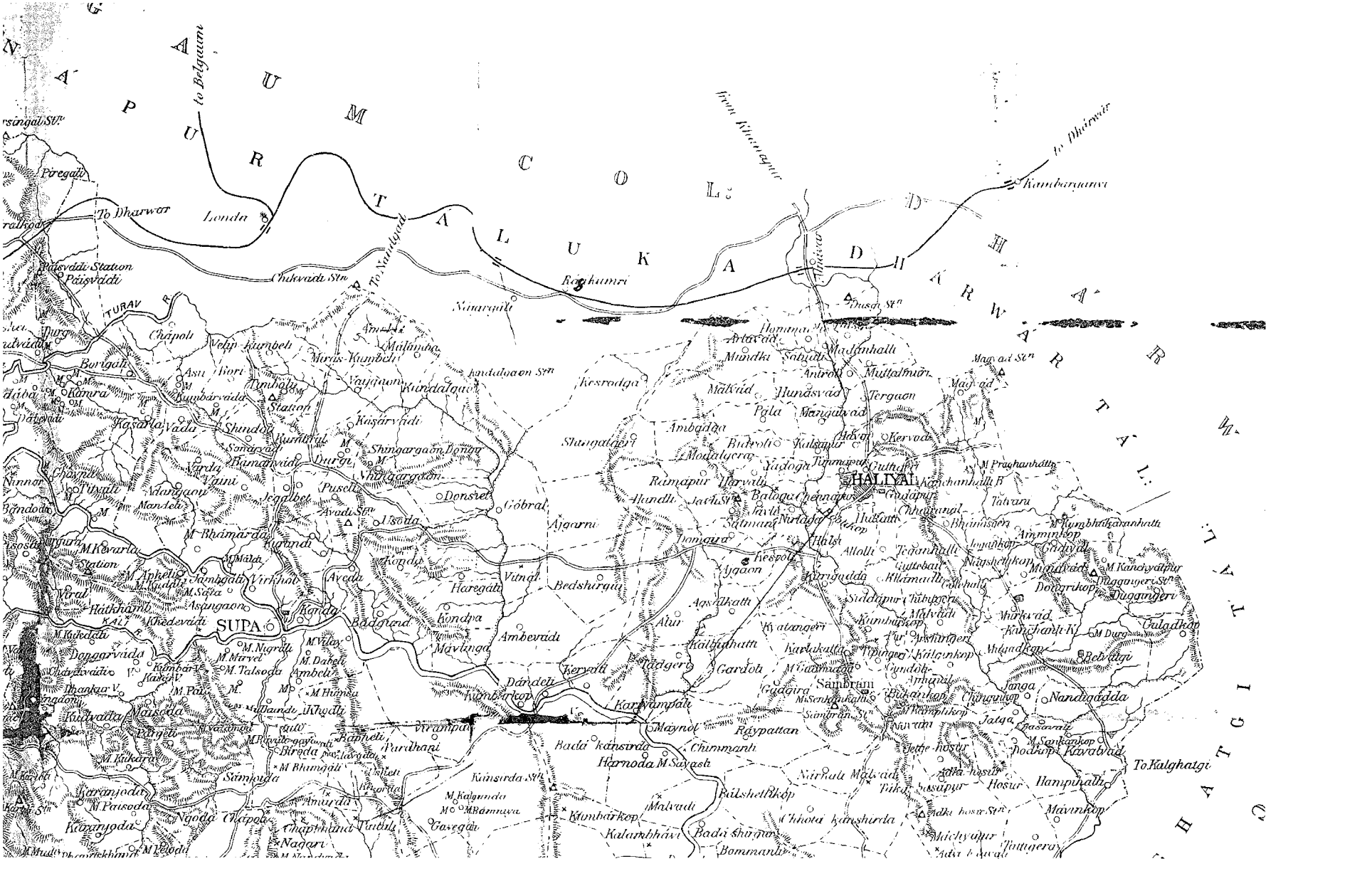
I have the honor to be, Sir,
Your most obedient Servant.

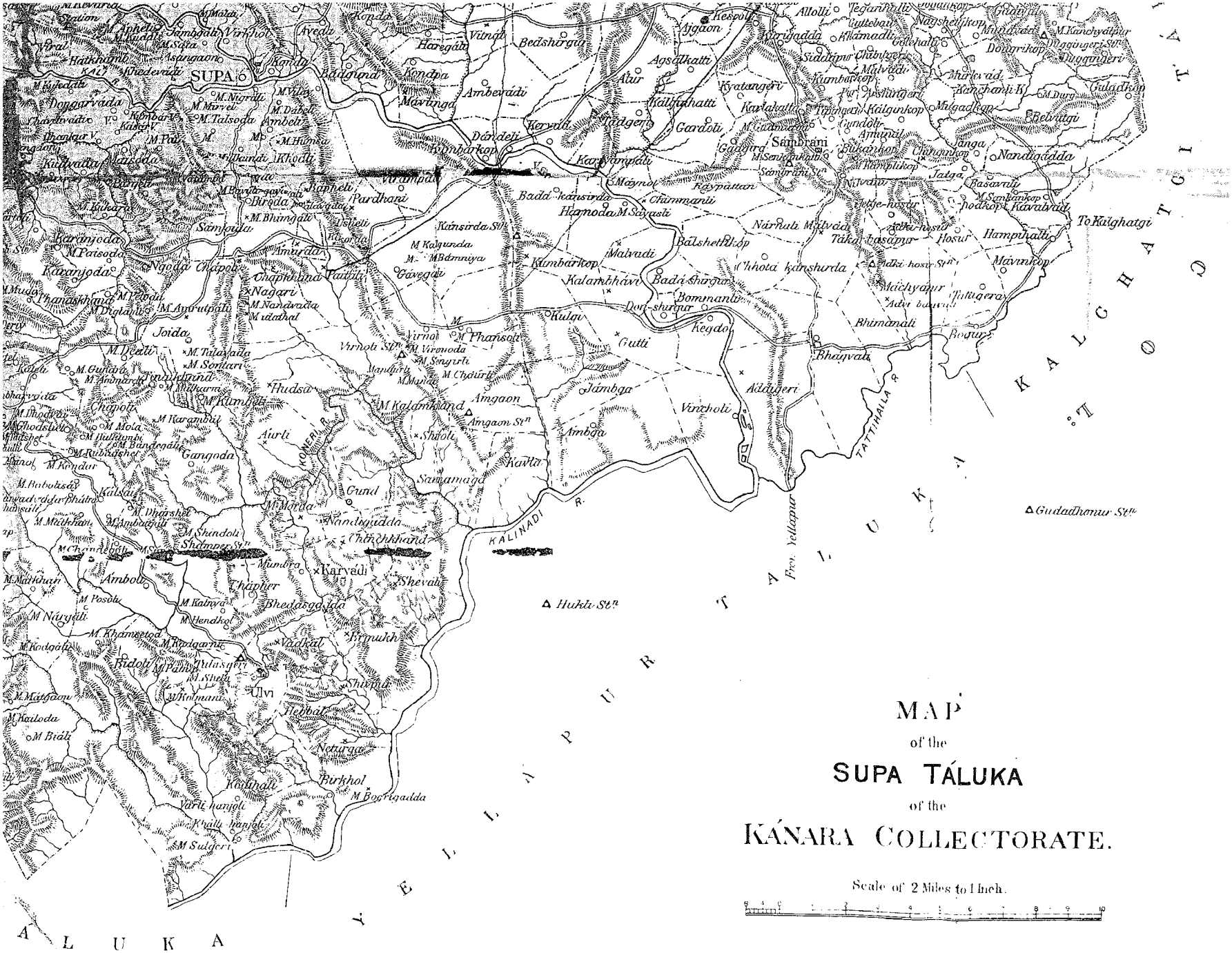
W. W. Medlicott
Ag: Commissioner
Pegu. S.D.


BELGAUM
KHANAPUR
TERRITORY
Pálda
Viranola
Valpa
Ramgurh
Támsoda
Marsangal Stn
Medá
Varlvádi
Ahmedudegáli
Khayti V.
Karmbal
Pregali
To Khánápur
To Belgaum
To Dharwar
Londa
Tinai Station
Sávarkop
Barakgad
Ammod
M. Marvel
Pásvadi Station
Pasgvádi
From Goa
M. Ambevadi
Kalambuli
Ati
Castle Rock
Durg
Chándvadi
Chapoli
Velip-kumbeli
Amshet
Málamba
Murgs-kumbeli
TURAV R.
To Nárágad
Chikvádi Stn
Chaphon
Kámra
Vádadriba
Kumbárvádi
Station
Vaygaon
Kundalgaon
Kásarla
Vada
Shundal
Kásárvádi
Somárvádi
Shingargaon Donga
Shingargaon
Donsheli
Varda
Bámanvádi
Vaini
Pitvali
Adamgaon
Jeggalbet
Pusali
Mandeli
Avadu Stn
Usoda
M. Bhámárda
Kuvesi
M. Bándoda
M. Phopalvádi
Ninnor
Surgura
M. Kovarla
Station
M. Kurvara
M. Kudrada
M. Pisoli
M. Aphelu
M. Gaddali
M. Sáta
Jambgala
Varkhol
Aivedu
Kanda
Hangáli
Viral
Hatkhamb
KALI R.
Kudevádi
SUPA
Asuth
M. Shurola
M. Kukrada
M. Vadeli
Doggarvada
M. Nigrali
M. Vilas
Mavinga
M. Marvel
M. Talsoda
M. Dabeli
Ambeli
M. Kanara
M. Kanaya
Sultani
Chándvádi
Kombar V.
Kasar V.
Durga
M. Bondoli
Customs House
M. Dudmali
M. Medukhan
Thankur V.
M. Pal
M. Humsa
Khandgaon
Kudvada
Masoda
Ganjeli
Khandi
Khpali
Virampali
Pardhani
Birgda
M. Bhumgali
M. Kukarali
M. Spirola
M. Karlali
M. Ramm
Karanjoda
Sámgada
Ushegli
Kánsa
M. Kalgunda
M. Ramm
M. Pansoda
Amaradi
Ngoda
Chapoli
Chapkhinda
Pautali
Gávegan
Kazanyoda
Nagari
M. Nandvada
Madathal
Terali
M. Mudsi
Phanashkhanda
M. Peloda
M. Digalali
M. Amrutpala
Jonda
Virnoli
Virnoli Stn
M. Virnoda
Kumbari Stn
M. Kelali
M. Antgaon
M. Deali
M. Talarkada


KHALAPUR
TERRITORY
To Belgaum
To Dharwar
To Khánápur
To Nárgánd
From Goa
From Mormugao
Kuvesi Station
Tinai Station
Castle Rock
Marsingal Stn
Pásvádi Station
Chikvádi Stn
Kásárvádi
SUPA
Kánda
Virnoli Stn
Kumbhari Stn
Kusavli Stn
Párda
Viranola
Valla
Támsoda
Medha
Varlvádi
Karambal
Ahetadivegáli
Khanapur V.
Puregali
Sávarkop
Báralkody
Armod
Kulambuli
Deudi
Konshet
Chundvádi
Durga
Chápoli
Velip-Kumbeli
Amshet
Málamma
Vaijgaon
Kándalgáon
Kumbárvádi
Shindoli
Kurmbhal
Shingargaon
Nanda
Bámanvádi
Vatni
Adangaon
Mandoli
Jegalbet
Pusoli
Donsoli
Usoda
Bhámarda
Kámdi
Kevarla
Máldi
Konda
Aphelia
Jambgáli
Virkhol
Aveda
Hargáli
Viral
Hathkhamb
Asngaon
Khedevádi
Badgund
Asuli
Shirola
Vábeli
Dongarvada
Sultani
Charavadi
Kámbar V.
Kásar V.
Ambeli
Dudmala
Khanapur
Kudvalla
Maisoda
Canjeli
Pardhani
Birodá
Sámpoda
Ushteli
Karanjoda
Nagoda
Chápoli
Amarda
Vaitali
Nagari
Nandvada
Madathal
Terali
Joida
Derva
Virnoli
Párda
Kalambuli
Ambevadi
Mável
Durg
Chápoli
Kánra
Vada
Shindoli
Kásárvádi
Tivoli
Phopalvádi
Ghaspadi
Tuljali
Kuvesi
Bándoda
Kusnáda
Kevarla
Aphelia
Kudali
Sáta
Asngaon
Kánda
Khedevádi
SUPA
Kálí R.
TURAV R.

SUPA
SUPA TALUKA
KÁNARA COLLECTO
Scale of 2 to 1 Inch
Supa
Hukeri St.
Hukeri
Gokak
Belgaum
Dharwar
Kaladgi
Bijapur
Karwar
Goa
Sirsi
Yellapur
Mundgod
Haliyal
Ankola
Honavar
Bhatkal
Kumta
Supa
Karanja
Asuli
Dongarvada
Sultari
Chandadra
Khanapur
Kudvada
Marsada
Khanagaon
Pargeli
Kusmanda
Kuzanoda
Teralu
Nagoda
Chapoli
Nadari
Indra
Jhalavli
Kumbhar vada
Chugoli
Kamat da
Kurla
Sammagad
Nandgadda
Gund
Karadi
Shivoli
Jamba
Amgaon
Kalamkhand
Vincholi
Kadli
Kegdo
Gutti
Bhagwati
Addageri
Bhimanadi
Bommanli
Bada Shirgaon
Kulan
Chhota Kansarda
Bada Kansarda
Harmoda
Chammanli
Rayputtan
Maynol
Karwampati
Dandeli
Kumbarkop
Kyatangeri
Kalgutgatti
Karlakatti
Gardoli
Sambran
Gadgira
Kerwadi
Alur
Amberadi
Mavinga
Hargati
Vitnal
Bedshergur
Konda
Aveli
Kondra
Kalgund
Hatkhamb
Viral
Sataon
Aphelia
Jambgali
Vaghoti
Kedevadi
Kalsa R.
Kumbar V.
Kasar V.
Thankur V.
Bhimgadh
Khedli
Vaindla
Bapheli
Pardhani
Bhimgadi
Samboda
Amrutpali
Phanashkhuri
Indra
Tilvadi
Sonsari
Andharali
Mukhari
Kumbeli
Hudsi
Chap


NAPAUMTALUKA
PURTA COLLY
to Belgaum
from Khanapur
to Dharwar
To Dharwar
Londa
To Nandgad
Chikvadi Stn
Kaghumri
Kambarganvi
Dudsagar Stn
Parsvadi Station
Parsvadi
TURAV R.
Durga
Chapoli
Velip-kumbeli
Amadi
Malamba
Mirus-Kumbeli
Vaijgaon
Kundalgaon
Kundalgaon Stn
Kesvadga
Burgali
Asu
Biori
Timboli
Station
Kumbarvada
Kamra
Kasarla
Vada
Shundoli
Kusarvadi
Samarvad
Durga
Shingargaon Donga
Shingargaon
Tarli
Tamni
Manjgaon
Jegalbet
Pusel
Donsvet
Gobral
Avadi Stn
Isoda
Ajgarni
Rhamardol
Kondi
Kevarla
Station
Malda
Aphelim
Jamgadi
Virkhol
Sesta
Avadi
Haregali
Vitnal
Bedshurgali
Asangaon
Kegrida
SUPA
Khedevadi
Kondpa
Badgaon
Ambevadi
Mavlinga
Kalkuhedali
Dangarvada
Kumbar V.
Kamat V.
Thankar V.
Kudvatta
Maisoda
Kalgeli
Birvadi
Ramheli
Vrampal
Pardhani
Kumbarkop
Dardeli
Jervali
Kadgera
Karlyampali
Maynol
Raypattan
Badal kansurda
Chimmanli
Harnoda
M. Savash
Kansurda Stn
Simjoda
Karanjoda
Parsoda
Ngoda
Chapoli
Amurdi
Chaphimal
Tudali
Nagari
Kanayoda
Garegali
Kumbarkop
Kalambhavi
Malvadi
Badal shirgun
Bommanli
Bulshetkop
Nirkali
Malvadi
Chhota kansurda
Hamiphalli
Hosur
Mavinkop
Jatga
Nandigadda
Chinguikop
Sambrum
Gudgira
Gardoli
Karlakatta
Kalgalhatti
Agasalkatti
Alur
Kalgunka
Kumbarkop
Siddapur
Chibugeri
Kambarkop
Malvadi
Kalgunkop
Mulgaon
Kanchanli Kl.
Dugganageri
Dugganageri St.
Gulgadkop
Nandigadda
Chinguikop
Janga
Kavalvad
To Kalghatgi
Podkop
Jette-hosur
Tikar
Basapur
Hosur
Mavinkop
Malchyapur
Jattageri
Kambarganvi
Kanchanhalli B.
Kanchanhalli
Mag. ad Stn
Magvad
Madanhalli
Muttalmuri
Antroli
Kervad
Hunasvad
Tergaon
Pala
Manigalvad
Malvad
Ambgalda
Budroli
Kulsapur
Modalgera
Yadoga
Timmapur
Ramapur
Harvali
Balagar
Chennapur
Jacli St.
Hundli
Nurtagi
Salmani
Donigera
Kesapur
Ugaon
Allolli
Jegankatti
Kittur
Chikkanagi
Tatvani
Bhimsen
Ammpkop
Ganjvadi
Nagshetkop
Mugalvadi
M. Kanchyapur
Dongarkop
Mirkvadi
Kanchanli Kl.
M. Durga
Malvadi
Kambarkop
Kalgunkop
Mulgaon
Kumbarkop
Siddapur
Chibugeri
Agasalkatti
Alur
Kalgalhatti
Karlakatta
Gardoli
Gudgira
Sambrum
Karlyampali
Maynol
Raypattan
Badal kansurda
Chimmanli
Harnoda
M. Savash
Nirkali
Malvadi
Chhota kansurda
Bulshetkop
Malvadi
Kalambhavi
Badal shirgun
Bommanli
Kumbarkop
Garegali
Kanayoda
Ngoda
Chapoli
Amurdi
Chaphimal
Tudali
Nagari
Simjoda
Kansurda Stn
Karanjoda
Parsoda
Birvadi
Ramheli
Vrampal
Pardhani
Kumbarkop
Dardeli
Jervali
Kadgera



MAP

of the

SUPA TÁLUKA

of the

KÁNARA COLLECTORATE.

Scale of 2 Miles to 1 Inch.

Kaiwara Forest Railway

(Print docketed with this)

Letter from the Commissioner

C.D. No. 1902, dated 15th June 1889.

Submitting the report called

for in Government letter No.

2159 dated 20th March 1889 on the

subject of the proposed Kaiwara

Forest Railway

Submitted with

reference to the Hon:

Mr. Ritchie's minute

dated 12 March

1889 and Regulations

742A, 743A & 744A

S.G. M
27 6 89

The working plans
spoken of in this
letter of the Commissioner C.D.
No. 5653 - 24 March/89
must be awaited.
27/6/89

No 3958 of 1889-90

Conservators office, S C. 401

Tadas Dharwar District, 23rd December 1889

From

The Conservator of Forests, S C.

To

The Chief Secretary to Government
Revenue Department
Bombay

Sir

RECD JAN 2 1890

I have the honour to submit a report on the capability of the forests to be tapped by a railway from Gund to Nāgargāli on the Southern Mahratta Railway

2. The area which would be tapped by the line would yield I estimate the following quantities of each species annually

Species	Tons of squared timber
Teak	4709
Blackwood	1805
Mati	2974
Kindali	2754
Jāmbā	5465
Nānā	2741
Other species	2286

I have the honor to be, Sir,

Your most obedient Servant

J. A. Macnabb

Conservator of Forests, Southern Circle.

19824

Kaiwarra Tramway

(Print docketed with)
Letter from the Commissioner
of Rs, No 1902, dated 15th June 1889.
submitting the report called
for in Government letter No
2169 dated 20th March 1889 on the
subject of the proposed Kaiwarra
Street Railway

Submitted with
reference to the Hon.
Mr. Ricky's minute
dated 12 March
1889 and Regulations
742A, 743A & 744A

25 cs
27 6 89

The working plans
of the promises in
the Conveyance S. C.
No 5653 - 29 March 89
must be awaited
before [illegible]

No 3958 of 1889-90

Conservator's office, S C

Tadas Dharwar Districts 23rd December 1889.

From

The Conservator of Forests, S C.

To

The Chief Secretary to Government

Revenue Department

Bombay

Sir

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Blackwood	1805
Mati	2974
Kindali	2754
Jambā	5465
Nānā	2741
Other species	2286

I have the honor to be, Sir,

Your most obedient Servant

J L Hencheyo

Conservator of Forests, Southern Circle

Estimate of the sustained annual yield of the forests to be tapped by the proposed Hágargáli-Gund Railway

I. Introduction

This is a rough estimate of the sustained annual yield of the forests which would be tapped by a railway from Hágargáli on the South Maratha Railway or Dá terminus at Potoli, or Gund, as the case may be.

2. The estimate for Gund has been kept distinct from that for the forests East of the Kánerí-Nadi, because the survey of the proposed line at present extends only as far as Potoli (21 miles from Hágargáli and because it appears to be of doubtful

doubtful expediency to carry the line at once some 15–20 miles further, over bad ground, in order to tap the Gund group.

3. This Gund group is everywhere referred to in the following as Gund. It comprises the village of Bedasgadde, Kariyádi, Yermukh and Gund.

Possibly the Kánesi might be spanned by a wire-rope ear the crossing between the Gund and Aurle sides of the river, and the wood got across by this means Mr. Bell thinks it could be bridged in this manner. The distance from Potoli to the crossing would probably be about 10 miles for a railway

railway. The banks of the Ghats opposite Hurlee are high and steep.

5. Majors Bell and Oliver were particularly enjoined not to include in the estimate any forests whose wood could not be brought to a depôt above-ghats. There is a considerable quantity of produce in the Gund-group which cannot be exploited to the depôts above-ghats, and also some in the other beats of the forests.

6. Owing to illness of the establishment, it was impossible to fell test-trees for the forests of Beddasgaddi, Kariyádi, and Gund, aggregating 8812 acres and the results of measurements of

of sixty trees, of the required diameters, which had been felled in similar situations, similarly situated in the vicinity, were used in calculating the cubic contents of the standing stock of those areas

7. The number of test-trees felled was one per cent. of the standing stock on the test-areas for the classes over 25 inches: ½ per cents for those of 16-21 inches' diameter: and ¼ per cent. for the rest.

8. Mr. Bell did not fell test-trees for species other than those separately dealt with by Sum, whereas Mr. Oliver lumped all the

the less important trees ~~together~~
under the term ~~Saplings~~ &c. &c.

9. Mr. Bell had charge of
No. I Party and Mr. Oliver of
No. II.

10. The major classes proceed
by differences of 5 inches:
the minor classes by differences
of one inch: consequently,
the diameters of all trees
enumerated are accurate to
half an inch

11. A map on a scale of 2
miles to the inch is appended.

12. The area of the forests
examined is 117414·01 acres.

The

13. The topographical survey maps were not all required in time for their employment in the preparation of this estimate.

14. The areas of the following forests were taken from the topographical maps.

Sanmage,
Shiroli,

and the remaining areas from Revenue-Survey maps which appear to be sufficiently accurate & append a statement shewing the areas of the forests as calculated from the Revenue-Survey and the topographical maps.

15. The area of the test-plots amounted to 5 percent of the whole

whole area examined. It may perhaps be considered that this area is too small to give accurate results. That may be so. The opinion of the officers who carried out the work of enumeration is that it is sufficient, and, considering that the forests are very homogeneous as regards their composition, large blocks of one description alternating with large blocks of another, and that the test-plots are very long and narrow — considering all this, I think that the enumerated may be relied on to the extent I have relied on it. In this estimate An enormous margin has been left for error.

[illegible] margin, consists in (1) considering the exploitable size of trees (expressed in terms of the diameter) some 2–3 inches greater than is necessary, which is equivalent to raising the age of exploitability at least 20 years above that which is necessary: (2) providing for an increased number of exploitable trees as soon as these exploitable [illegible] become exhausted: (3) calculating the average yield for long periods and neglecting the increment which would accrue on the trees to be exploited during that period: (4) neglecting all returns from dead wood, or thinnings of any kind

kind, of which there will be the
natural course of things be a lar
quantity: (5) assuming, in calcul
= ing annual yields, that, when
trees of two or three size-classes
are to be exploited during the
first period, individuals in ea
size-class will be cut away at a
uniform rate every year, instead
of the larger ones being cut first
17. To shew what a very large
margin for error is derived from
these safe-guards, I will examine
the two which can be most easily
demonstrated, namely, the mere=
= ment which it is usual in cal
= culations of this kind to add to
the yield and the system of
providing

provision for an increased number of exploitable trees as time goes on will, for the sake of shortness, & confining the examination to teak, as the whole may be judged of by any of its parts, and to the areas inside the Gund-group.

(1) Increment

18 The present cubic contents of exploitable teak in the area examined by No. I Party (excluding Gund) and to be exploited during the next 83 years, amount to 1171. × 83 = 97193 of squared teak

19. The average cubic increment of a tree of the oldest class is .665 of a foot per cent per annum. Consequently, the present annual

timber- increment on the stock to be exploited during the next 83 years is 97,190 x 1665 ÷ 100 = 646 tons.

20. Every year, 1 — 83rd of the stock affording the increment will be cut away and, consequently, the increment will be diminished annually, in corresponding arithmetical progression. That is to say, half the present increment may be added to the annual yield or 323 tons of squared timber.

21. Similarly, it will be found that the standing stock of teak to be exploited during the first period in the area examined by the II Party comes to 2937 x 38 = 111,606 tons

22. The average cubic increment of a tree of the 26 inch class is

1.208

~~2208 Cubic feet~~ 1 per cent per annum.

~~Hence the increment of the stock~~
to be expected during the next 38
years, which must be added to the
annual yield amounts to
½ (111,606 × 1.208 ÷ 100) = 674 tons.

—11—

23. The total increment, which
might, therefore, be added to the
present estimated annual yield,
amounts to 323 + 674 = 997 tons
of squared timber.

"(2) Example of the caution
observed in fixing the
number of trees to be cut
annually.

24. I think it will suffice if
I confine my illustration to an
examination of the teak it is pro-
posed to exploit on the area
examined

examined by No. II Party (excluding Gund.) which affords double the yield obtained from the trees examined by No. I Party.

25. The yield comes to 2937 tons annually, the number of trees to be cut during the next 38 years being estimated at

52,957 of the 26 inch' class and
13,889 of the 21-25 inch' class.

26. At the end of the 38 years, the survivors in the 21-25 inch' class would all have become exploitable, and the survivors of the 164800 now in the 16-20 inch' class would have grown into the 21-25 inch' class. There would then be, if none died,

66846 trees in the 26 inch' class
210018 trees in the 21-25 inch' class
323339 trees in the 16-20 inch' class

At

At present there are

[illegible]437 of the 26 inch class

106,789 of the 21-25 inch class

210018 of the 16-20 inch class.

28. Of course the trees would not all survive, but after making full allowance for deaths, it is evident that the size-classes at the end of the period will be much better stocked than they are now. At the end of 76 years, if we continued to cut yearly the same number of trees, there would be at least twice as many trees over 25 inches in diameter as there are now, after making an allowance of over one-third for deaths of trees now in 16-20 inch class.

11—

29. It appears, then, probable that, if I have erred, the chances are very greatly in favour of my having underestimated the sustained yields of the forest. I do not wish the estimate to be considered final, but that it is sufficiently reliable, provided the field-work was carefully done, to warrant the exploitation of wood at the estimated rate until time can be found to make a more elaborate enumeration of the standing stock.

30 This much is certain, that it has taken Messrs Oliver and Bell more than one working season to measure the trees on 5 percent of

27") At present there are
62,437 of the 26 inch' class
26,789 of the 21-25 inch' class
10,018 of the 16-20 inch' class
28" Of course the trees would not
all survive, but after making full
allowance for deaths, it is evident
that the size-classes at the end of
the period will be much better
stocked than they are now. At
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the area is that, if the whole forest is to be enumerated before any action is taken, it will mean the postponement of increased exploitations for 20 years. My own view is that extensive enumerations for the timber-forests of the Southern circle, at all events for many years to come, are not desirable. When it comes to dealing with such very large areas great accuracy is not necessary as errors tend to correct themselves much more than when the areas examined are comparatively small. Another point

point in favor of this view is that large areas in other parts of the Circle are greatly in need of organization, and I think that it is better to have the whole timber-producing area roughly organized than to insist on accurate enumerations which would delay the systematic working of the whole for an indefinite period.

31. In this report, the word period occurs constantly and means the number of years required for the trees of one major class to grow into the next class (i.e. to grow 5 inches in

in diameter). The same term is used in forestry to denote the age-classes into which groups of a series are divided; and also the number of years a working-plan is intended to last without being renewed. It is necessary to [illegible] attend to the sense in which the word is employed in this estimate; otherwise, the reader might imagine that I wish to constitute periods of eighty years and more, and to attempt to this annual yield for the same

same period. Nothing could be further from my thoughts. When the forests are organized, I imagine that even twenty years will be found to be too long a forecast and that fresh plans of operations will have to be made every ten years

[illegible] been written, it follows that I am not about to discuss a plan of working the forests but to estimate the quantity of material which, on the strength of the data collected by Messrs Bell and Oliver, we

are

are wasteful in exploiting annually for, say, the next ten years, at the expiration of which it may, provided great accuracy be not insisted on, be possible to have framed definite plans for the exploitation regeneration and protection of the whole area, a work which has been commenced this season by Messrs Bell and Oliver.

33. The first thing that strikes one in examining the results obtained by the two parties, is the great difference

in the increments then have
obtained. This may possibly
be owing to the more sheltered
position of the forests examined
by Mr Oliver which are situated
in the lower-lying district
on both sides of the Kálánai
and the Bárelu-málá whereas
the forests examined by Mr.
Bell are situated mainly
on the rugged and exposed
slopes of the hills overlooking
the Káneri-river and the
Kulgi-ravine. Remeasurement
of some of the test-trees have

given

[illegible] differences
of measurement, and I think
that to the extremely bad current
growth of the teak in Mr. Bell's
tract must be mainly attributed
to the above-mentioned cause,
and partly also to the trees on
his section being much larger
than those on Mr. Oliver's.

344 Another point that at
once strikes the eye in the work
of I & II Party is the want of
trees in the youngest age-class
excepting that of Jámbá,
which is a great fore-excluder.
It is much less marked in
the

the statements of D.C.F. Carey,
in which the distribution of
teak amongst the age-classes
is satisfactory, but both
officers report that scarcely
any seedlings are to be found
This is, I take it, a very serious
matter and is due to the annu-
-nual fires. If these valuable
teak-forests are to be preserved
I won't say improved, it will
be imperatively necessary to
exclude fires, to reserve the
whole area, to bring it under
regular management and
to allow no timber to be taken
out

~~into district~~ permission.

15. I will now add a few words
in justification of the size of ex=
ploitability, or revolution
chosen:

Teak

36. Remains sound up to a
good old age, but it is not so
much great girth that is sought
after by purchasers as good long
a diameter of two feet at a
height of four feet from the
ground suffices for all purposes
I have taken 26 inches as the
minimum exploitable size.
Owing to the trees chosen for
exploitation

exploitation during the first period being all already 25 inches or more, the average size of exploitation will be much greater than 25 inches.

Blackwood

37. Remains sound very nearly if not quite, as long as teak: but it is required chiefly for carpentry and I propose to cut it as soon as it has grown into the 21—25 inch class, equivalent, if the age-classes were uniformly stocked, to an average size of exploitation of

of 2, 3 inches girth, considering
the present preponderance of old
trees, a considerably larger size
for the current term may be
expected.

Matti and Kindali

38. Are good timber-trees
and their age of exploitability
might be used to coincide
with that of teak. Old Kindals
trees are liable to heart-rot
and should, therefore, not be
allowed to stand too long.

Háná

39. Is another species
that

that is very liable to decay ~~if~~ in old age and should not be allowed to remain long after it has entered the 21–25 inch class.

Dindal, Karimatal & Dhámin

40. Probably also fudgas are comparatively short lived and should be considered exploitable when they have attained 16 inches in diameter.

41. The following statement shews the sizes at which I have put the exploitability of species for the purpose of this estimate

St

It should be noted that the normal average sizes of ex-plantation for the proposed terms are 2½ inches more than the minima fixed because the major size-classes proceed by differences of 5 inches; and that, on account of the preponderance of very large trees in the oldest size-class, the girths of the trees to be cut during the next 40 or 50 years will be much greater than the normal:

Peak, Matti, Kendal } Explainable on entering 25 inch class.

James

Jámbá
Káná
Hone
Balge
Blackwood

} Exploitable on attaining 21 inches. (21–25 inch class).

Dindal
Karimutal
Pudgus
Dhamin

} Exploitable on attaining 16 inches (16–20 inch class).

42. The estimated yield of the forests to be tapped by the proposed railway is as follows:—

3. I Area East of the Kanera (excluding Gan

Species	Exploitable size in inches	Maximum sustained Annual yield of square timber in tons of 50 cubic feet
Teak	26	4108
Blackwood	21	1724
Matti	26	2666
Kindal	26	2205
Jámbá	21	3114
Káná	21	1656
Hone	21	346
Balge	21	
Hedda	21	
Karimutal	16	72
Pudgus		
Dindal	16	122
Other species	26	1606
		17870

44. II Area West of the Sto'aneri

(Gurdi-group).

Species	Exploitable size in cubics	Maximum sustained Annual yield of squared timber in tons of 50 cubic feet
Teak	26	601
Blackwood	21	81
Matti	26	308
Kindal	26	549
Jámbá	21	2351
Ráná	21	1085
Other Species	26	140

45. III — Whole area

Species	Maximum sustained Annual yield of squared timber in tons of 50 Cubic feet
Teak	4709
Blackwood	1805
Matti	2974
Kindal	2754
Jámbá	5465
-ná	2741
er Species	2286

46. The above is an estimate of what appears to me to be a safe maximum sustained yield and one which, after the lapse of a half a century, ought to lead to much larger returns. I have given a reason for not wishing to work up to what is probably the fuller legitimate usufruct, or interest, of the forest-capital.

47. In Mr Atkins' D.O. 2160 of Secunth 20th March, 1889, I was asked to submit an estimate of the yearly capability of the forests which would be tapped by a railway from Ságargáli to Gund. I therefore submit an estimate of the yield which may be worked up to, wi

any remarks regarding external circumstances which might render a modification of that estimate desirable for practical purposes

48. The following statements are appended

1. Statement of major classes, number of trees, cubic contents, current diameter-increment, and cubic increment per cent, for each major-class examined by Dr's I° Party (x excluding Gund

2. Do- Do -- Do- No II Party Do-

3. Do- Do Do No I Party for Gund only

4. Do Do Do No II Do Do

49. I now proceed to the detailed estimate from which the serial results above given are derived.

50. II Detailed Estimate

Park I

Excluding Guanacaste

Teak

The number of trees in the 21"-25" class is 62,443

26"-? " 35,400

Total 97,843

The rate of growth in diameter of 21-25 inch trees is .06 of an inch. Therefore it will take the trees in the class $\frac{5}{.06} = 83$ years to pass into the exploitable class.

The number of trees in any of the other classes compares favorably with the number in the 26 inch class, and so I propose to cut during the next 83 years a number of trees equal to half the sum of the

contained in the last 2 classes, viz, 97843 ÷ 2 = 48,921, there being double that number in both 16×20 each class

Of these 48921 trees, 35400 belong to the 26" class
13,521 " " 21-25" "

The average tree of the 26" class contains 5,021,404 ÷ 35,400 = 142 c'
Do Do of class 21-25" 4,802,936 ÷ 2,443 = 77 c'

The number of trees of the 26 inch class to be exploited annually is 35,400 ÷ 83 = 427
Do Do of 21-25" class 13,521 ÷ 83 = 163
Therefore the contents of the 26 inch class in the ground to be exploited annually is 427 × 142 = 60,634 c'
Do Do 21-25" class 163 × 77 = 12,551 c'
Total of both classes = 73,185 c'
Do reduced to = 58,548 c'
= 1171 tons.

Blackwood

The 11-15 inch class contains 65,726 trees
The 16-20 inch class contains 30,420 trees
The 21-25 do do 11,695
26-? do do 861

The rate of diameter growth for the 16-20 inch class is .117. Therefore the trees of that class will take 5÷.117 = 43 years to grow into the next class.

The number of trees in the minor classes is sufficiently large to admit of the exploitation during the next 43 years of a number of trees equal to half the sum of the trees in the classes of over 15 inches' Diameter.

The 16-20 inch class contains 30,420
21-25 11,695
26-? 861
Total number exploitable during period 42,976
Half this sum = 21,488

of

of these.

861 one 26 inch trees
11,695 — 21-25 do
8932 — 16-20 do

The number in each class is annually exploitable is

of the 26 inch class 861 ÷ 43 = 20
21-25 11,695 ÷ 43 = 272
16-20 8,932 ÷ 43 = 208

An average tree of the 26" class contains 97226 ÷ 861 - 113 c'
21-25 699,411 ÷ 11,695 = 59 c'
16-20 1,193,097 ÷ 30,420 = 39 c'

The contents of the 26" class annually exploitable are 20 × 113 = 2260 c'
do do 21-25" class 272 × 59 = 16,048 c'
do do 16-20 do 208 × 39 = 8,112 c'

Total of all classes annually exploitable in the round = 26,420
do do Squared = 21,136
= 422 tons.

Maki

The 16-20 inch class contains 50,622 trees
21-25 — " — 31,382
26-? — " — 15,664

The rate of growth

in Diameter of the 21-25 inch class is 115. Therefore trees in that class require 5 ÷ 115 = 4 years to grow into the next class. The numbers of trees in the minor classes being fairly load, it is proposed to cut during the next 43 years a number of trees equal to half the number now in the two last classes, or 31,382 + 15,664 = 23,523. Of these 15,664 are in the 26 class And 7,859 are in the 21-25 class

The number annually exploitable is:

Of the 26" class 15,664 ÷ 43 = 364
21-25" 7,859 ÷ 43 = 183

The average tree of the 26" class contains 47,58,269 ÷ 15,664 = 112 c'
Do Do 21"-25" class 2,547,995 ÷ 31,382 = 81 c'

The contents of the 26" class annually exploitable are therefore - 364 × 112 = 40,768
Do Do of 21"-25" class 183 × 81 = 14,823
Total of both classes annually exploitable in the round = 55591
Do Do Squared = 44,473
= 889 tons

Kuwadali

The number of trees in the 21-25 class is 32,504

The number of trees in the 26-? class is 18,140

50,644

The rate of diameter-growth of the 21-25 inch class is .128. Therefore the trees in that class will require 5 ÷ .128 = 39 years to grow into the exploitable class.

There being comparatively few trees in the 26" class and the number of trees in the minor classes being favourable, I propose to cut during the next 39 years a number of trees equal to half the sum of the trees in the 2 older classes, or 50,644 ÷ 2 = 25,322.

Of these 18,140 are in the 26" class

" " 7,182 " " 21-25" "

The number annually exploitable

of the 26" class is 18,140 ÷ 39 = 465

of the 21-25" " is 7,182 ÷ 39 = 184

The average tree of the 26 inch class is 2,004,548 ÷ 18,140 = 110 c'

do do 21-25" class 1,887,520 ÷ 32,504 = 58 c'

The contents of the 26 inch class annually exploitable are ——— 465 × 110 = 51,150 c'

" do do 21-25 inch class 184 × 58 = 10,672 c'

Total of both classes

in the round ——— = 61,822 c'

do do squared = 49,457 c'

989 trees

Jamba

The 16-20 inch class contains 86,677 trees

21-25" ——— 39,278 "

26" ? ——— 17,430 "

Total 143,385

The rate of diameter growth of the 16-20 inch class was. Therefore, it will take trees in the 5 ÷ .155 = 32 years to be raised into the next class. The number of trees in the minor classes being extremely good, there can be no objection to exploiting during the next 32 years a number of trees equal to half the sum of those now in the last 3 classes, or 143,385 ÷ 2 = 71,692. Of these 17,430 are in the 26 inch class

39,278 " 21-25 "
14,984 " 16-20 "

The number annually exploitable of the 26 class 17,430 ÷ 32 = 545

" " " 21-25 " 39,278 ÷ 32 = 1,227

" " " 16-20 " 14,984 ÷ 32 468

The

The average tree of 26" class is

Do Do of 21-25" " 3,745,043 ÷ 69,481 = 54 c'

Do Do of 16-20" " 4,342,552 ÷ 143,975 = 30 c'

The contents of the 26" class annually exploitable are = 545 × 70 = 38,150 c'

Do Do of 21-25" " 1227 × 54 = 56,258 c'

Do Do of 16-20" " 468 × 30 = 14,040 c'

Total of the three classes

in the round = 108,448

Do Do squared = 86,758 c'

= 1735 tons

Nāwā

The number of trees in the 16-20 inch' class is 27,294

Do Do 21-25 " — 20,978

Do Do 26"- ? " — 9,185

The rate of growth of trees in the 16-20 inch' class is .14. Therefore it must take 5 ÷ .14 = 36 years for them to reach the next higher class.

A prospective bench during the period only 27,000 trees, leaving to cut 30,000 odd is in the 16-20 inch class and 21-25 inch class. The paucity of trees in the 2 last classes seems to require the holding over of some exploitable trees of the 21-25 inch class.

Of these 27,000 trees, 9,135 are in the 26" class
17,865 are in the 21-25"

The numbers annually exploitable is

Of the 26" class 9135 ÷ 36 = 254
21 25" " 17,865 ÷ 36 = 496

The average tree of the 26 inch class contains 1,008,862 ÷ 9,135 = 110 C'
Do do 21-25" class 1,387,905 ÷ 20,978 = 66 C'

The contents of the 26" class annually exploitable are 254 × 110 = 27,940 C'
Do do 21-25" class is 496 × 66 = 32,736 C'

Total exploitable annually
in the round = 60,676 C
Do do squared = 48,541 C'
= 971 tons.

Dhämin

The number of trees in the
16–20 inch' class is 8,840
21"–25" — 1,543
26" ? — " — 336
Total 10,719

The rate of growth of trees in the 11–15 inches' class is 124. Therefore, will, take trees in that class 5 ÷ 124 = 40 years to grow into the next class.

During that period of ~~[illegible]~~ to cut 15,000 trees, there 19,000 trees in the 11–15 inch' class. Of these 15000 trees, 336 are in the 26 inch' class

1543 — " — " — 21–25"

8840 — " — " — 16–20"

4281 — " — " — 11–15"

The number annually exploitable is of the 26 inch' class 336 ÷ 40 = 8

21–25" 1543 ÷ 40 = 39
16–20 8840 ÷ 40 = 221
11–15 4281 ÷ 40 = 107

The average tree of the 26 inch' class contains 30,738 ÷ 336 = 91 c'

Do Do 21÷25 class 56,243 ÷ 1543 = 36 c'

6"÷20" " 177,252 ÷ 8,840 = 20 c

11"÷15" " 325,243 ÷ 23,471 = 14 c'

The contents of the 26 inch' class annually exploitable are 8×91 = 728 c'

Do Do 21"÷25" " " 39×36 = 1,404

" " 16"÷20" " " 221×20 = 4,420

" " 11"÷15" " " 107×14 = 1,498

Total contents annually exploitable on the ground = 8,050

Do — Do — squared = 6,440

= 129 tons.

Hêtre, Bâlge and Hêddi

These 3 species are taken together because, taken separately they do not afford a workable gradation of age-classes, and because they are not largely represented.

The 6-1

The 6-10 inch class is not represented at all. The other larger classes are very fairly represented in respect to each other.

The 11-15 inch class contains 6,689 trees

16-20 " " 3,617

21-25 " " 4,838

26" ? " " 4,817

The 16-20 inch class is not represented by heddi at all. The other two species in that class are shewn to grow in diameter in the one case at the rate of .22, and in the other at the rate of .172. I take the latter rate as the safer. A 16 inch tree in the 16-20 inch class would measure 5 ÷ .172 = 28 years to grow into the next class.

Allowance to cut only 5500 trees during that period in account of the 16-20 inch class not being sufficiently represented. Of these 5,500 trees 4,817 belong to the 26 inch class and

683 " 21-25" "

The number annually exploitable is

Of the 26 inch class 4817 ÷ 28 = 172

Do Do of 21-25 " 683 ÷ 28 = 24

1 tree of the 26 inch class contains 579,475 ÷ 4817 = 120 C'

Do Do 16-20 inch 191,237 - 4838 = 40 C'

The contents of the 26 inch class exploitable annually are 172 × 120 = 20,640

Do Do 21-25 inch is — 24 × 40 = 960

Total contents annually exploitable in the round 21,600

Do Do squared = 17,280

= 346 tons

Dividab

The number of trees in 11-15 class 34,025
do do 16-20 8,565
do do 21-25 750

The rate of growth of the 11-15 inch class is .071. Consequently trees in that class will take 5 ÷ .071 = 70 years to grow into the next class. The 11-15 inch class is so broadly represented that I consider we might safely cut 18,000 trees during that period, which would still leave 25,582 trees in the 11-15 inch class.

The number annually available is:-

of the 21-25 inch class 750 ÷ 70 = 11
do do 16-20 " 8565 ÷ 70 = 122
" 11-15 " 8685 ÷ 70 = 124

The average tree of the 21-25 inch class contains 65,663 ÷ 750 = 88 C'
do do 16-21 inch 313,126 ÷ 8565 = 37 C
do do 11"-16" " 595,248 ÷ 34,267 = 17 C

Thos

The contents of the 21-25 inch' trees annually exploitable are 11×88=968

do — do 16-21 inch' — 122×37=4,514

do do 11"-16" " — 124×17=2,108

Total contents annually exploitable in the pound = 7590

do — do — squared — = 6,072

= 122 tons

Karimutal and Fudgus

Fudgus is not sufficiently represented to be treated along Karimutal is also, comparatively speaking, a rare tree Both are short-lived and suited to the same revolution.

The 11-15 inch class contains 8,753 trees

The 16"-20" " " — 3,115 "

The grade of growth of the 2 species appears to be about the same, namely 12 for the 11-15' inch class. Therefore, trees in

in that class would take 5 yrs ÷ 12 = .42 years to grow into the next class

. The distribution of age-classes seems to warrant the cutting of 5000 trees during the above period of these 3,115 belong to the 16-20 inch class

1885 —— " —— 11"-15" "

The number annually exploitable is:

Of the 16 20 inch' class 3115 ÷ 42 = 74

" do do 11-15" " 1885 ÷ 42 = [illegible]

The average tree of the 16-20 inch class contains 152,461 ÷ 3115 = 49 c

do do 11-15 inch' class 167,279 ÷ 8,753 = 19 c

The contents of the 16-20 inch' trees annually exploitable are 74 × 49 = 3,626 c

do do 11 15 inch' " 45 × 19 = 855 c

Total contents annually exploitable in the pound — = 4,481 c

do — do — squared — = 3,585 c

= 72 tons.

Party No. II

Excluding Gums

Teak

The number of trees of 21-25 inch' class is 86,73
26" and over — 52,95
Together —— 133,69

The rate of growth in Diamete of the 21-25 inch' trees is .13 of a inch yearly. Therefore it will tak the trees of that class $\frac{5}{.13} = 38\frac{1}{2}$ to grow into the next class.

The lower age-classes are extremely well represented, there being twice as many trees in the 16-20 inch' class as there are in the 21-25 inch'. We s shoots, therefore, be perfectly justified in exploiting duri the next 38 years a number of trees equal to half the sum of the trees in the two last classes (21 inches and ove

These two classes contain 133,692 trees and the number to be exploited during the period mentioned is therefore $\frac{133692}{2} = 66,846$ Of these 66,846 trees 52,957 belong to the 26" class and 13,889 to the 21-25 inch class.

The number of 26 inch trees annually exploitable will be $\frac{52,957}{38} = 1,394$

Do. Do. 21-25 inch trees $= \frac{13,889}{38} = 365$

The average tree of the 26" inch class $= 5,861,831 : 52,957 = 111$

Do. Do. of 21-25 inch class $= 6,357,872 \div 80,736 = 79$

The cubics of the 26 inch class annually exploitable in the round are $1394 \times 111 = 154,734$ c'

Do. Do. of 21-25 inch class is $365 \times 79 = 28,835$ c'

Total exploitable of both classes in the round $= 183,569$ c

Do. Do. squared $= \frac{4}{5}$ of $183,569 = 146,855$ c'
$= 2937$ tons

In the above estimate it is calculated, as already observed, that

that a number of trees equal to half the sum of those contained in the two oldest classes will be exploited during the next 38 years. At the end of that period, the surviving trees now in the 21-25 inch class would all have become of exploitable size, and the survivors of the 164,800 now in the 16-20 inch class would have grown into 21-25 inch trees. The number of trees in the two oldest classes would, therefore, be very far superior to the number now in them at the end of 76 years if we continued to cut yearly the same number of trees as that now proposed, there would be at least three as many trees over 25 inches in diameter

as there now after making an ample allowance of over one third for deaths of trees now 16-20 inches in diameter.

Farther ahead it is scarcely necessary to look but it will be observed that the number of trees in the 6-10 and 11-15 inch classes is good ~~as~~ compared with the number in the oldest classes, and that they foreshadow a doubling of the present proposed yield some 80 years hence.

All trees over 24 inches in diameter may be considered exploitable and if the trees in the 21-25 inch class are proportionately represented, there must now be 2257 more trees in that class already exploitable, than

than it is proposed to cut
during the next 38 years.

No increment has been
taken into consideration
although it would add several
hundred tons to the annual
yield. In order to be on the
safe side, it has been left
out of the calculation.

Blackwood

Number of trees of 26" diameter 6816
21-25" " " 32078
16-20" " 80,419
Total 119,313

The rate of growth in
diameter for the class 16-20" is
136: therefore it will take $\frac{5}{136}$ =
37 years for the trees in that
class to grow into the 21 inch
class.

It is proposed to cut half
the sum of the trees in the
3 last classes or $\frac{119,313}{2}$ = 59,656
during that period.

Of these 59,656 trees,

6816 belong to the 26" class
32078 " 21"-25" "
20762 " 16"-20" "

The number of trees annually exploitable is $\frac{59656}{37} = 1612$

Number annually exploitable of the 26" class $= \frac{6816}{37} = 184$

Do Do of 21" 25 clap $\frac{32078}{37} = 867$

Do Do of 16-20 " $\frac{20762}{37} = 561$

Average tree of 26" class - $\frac{711965}{6816}$ c' = 104 c'

Average tree of 21-25 inch class $\frac{1766,308}{32,078} = 55$ c'

Average tree of 16-20 inch class $\frac{2,138,750}{80410} = 26$ c'

Contents of 26 trees annually
exploitable $184 \times 104 = 19,136$ c'
Contents of 21-25 Do Do $867 \times 55 = 47,685$ c'
Do of 16 20" class Do Do $561 \times 26 = 14,586$ c'
Total of all three classes
annually exploitable in the round = 81,407 c'

Do Do squared $\frac{4}{5}$ 81407 = 65,125
= 1,302 loads

Mati

Number of trees of 26" diameter is 34,116
Do Do 21 25 " 64,651

Total 98,767

The rate of growth in
diameter

Diameter of the class 21-25 in 132 years. Consequently, it will take $\frac{5}{132} = 37$ years for the trees in that class to proceed into the next higher class.

It is proposed to cut half the num of the trees in the two last classes or $\frac{98767}{2} = 49,383$ during that period.

Of these 49,383 trees

34,116 belong to the 26" class
And 15,267 " " 21-25"

The number of trees annually exploitable is $\frac{49,383}{37} = 1335$

Number annually exploitable of the 26" class = $\frac{34116}{37} = 922$

Number annually exploitable of the 21-25" class = $\frac{15,267}{37} = 412$

Average tree of 26" class = $\frac{3712800}{38,743} = 95$ c'

Do Do of 21-25" " = $\frac{3853867}{66,803} = 57$ c'

Contents of 26" trees annually exploitable = $922 \times 95 = 87,590$ c

Do Do of 21-25" class $412 \times 57 = 23,484$ c

Total of both classes annually exploitable in the forest = 111,074 c'

Do Do reduced = 88,859 c'

= 1,777 tons

Naiya

Number of trees of 26" Diameter 4,560
Do. Do. 21-25 ——— 12,037
16,597

The grade of growth for the 6-20" class is 1/64 : therefore it will take 5/1/64 = 30 years for the trees in that class to grow onto the 21 inch class. . .

It is proposed to exploit all the exploitable trees during these 30 years, i.e 16,597 of which 4,560 belong to the 26" class 12,037 . . . to the 21-25" class

The number of trees annually exploitable is 16,597/30 = 553

Number annually exploitable of the 26" class is 4,560/30 = 152

Number annually exploitable of the 21-25" class is 12,037/30 = 401

Average tree of 26" class = 444,479/4,560 = .97 c

Average tree of the 21-25 inch class $\frac{842,125}{12,037}$ = 70 c'

Contents of 26" trees annually exploitable 152 x 97 = 14,744 c'

Contents of 21-25 inch trees annually exploitable = 401 x 70 = 28,070 c'

Total of both classes annually exploitable on the ground = 42,814 c'

Do Do Squared = 34,251 c'

685 tons

Jāmbā

Number of trees of 26" Diameter = 3,851

Do Do 21-25" = 22,490

Do Do 16-20" = 74,341

Total 100,682

The grade of Iroquithro of the 16-20" class is 159; therefore it will take $\frac{5}{159}$ = 32 years for the trees in this class to grow into the next

It is proposed to cut half the num. of the trees in the last 3 classes or $\frac{70,682}{2} = 35,341$ during the next 32 years.

Of these 50,341 are

3,457 are the 26" class

22,490 " 21-25"

24,400 " 16-20"

The number of trees annually exploitable is $\frac{50,341}{32} = 1,573$

The number of trees exploitable of the 26 inch class is $\frac{3,457}{32} = 108$

" " of 21-25 class is $\frac{22,490}{32} = 703$

" " of 16-20 class is $\frac{24,400}{32} = 763$

Average tree of 26" class $\frac{415,693}{3,457} = 120$ c'

" " of 21-25" class $\frac{1,447,630}{22,490} = 64$ c'

" " of 16-20 class $\frac{2760,160}{74,741} = 37$ c'

Contents of 26" trees annually exploitable = $108 \times 120 = 12,960$

Contents of 21-25 trees annually exploitable = $703 \times 64 = 44,992$

Contents of 46 exploitable trees.

annually exploitable 763 x 39 = 29,231

Total contents

of the three classes

annually exploitable

in the proceeds = 86,189

Do. Do squared = 889,426

= 1,379 tons

Kein dali

Number of trees in the 26" class is 22,900

The rate of growth in

Diameter for the 21 & 25 inch

class is 1.57 ; therefore, it will

take $\frac{5}{1.57}$ = 3 years. for the

trees in the next lower

the exploitable class.

It is proposed to

cut all the trees in the

26" class during this

period and the remainder

annually exploitable at the rate

$\frac{22900}{33} = 694$.

The average tree of the 26"

class $= \frac{2,407,895}{22,900} = 105$ c.f.

Contents of trees annually

exploitable in the pound $724 \times 105 = 76,020$ c.f.

Do. Do. squared $= \frac{\text{c.f.}}{6,816}$

$= 1216$ tons

Other species

Number of trees of 26" diameter 24,823.

The rate of

growth in diameter for

the 21-25 inch class is .198"

Therefore it will take the

trees in that class $\frac{5}{.198} = 25$

years to grow into the

next class.

It is proposed to cut all the

trees in the 26" class during that

period. There are only 15,201 trees

in the 21-25 inch class but this

is compensated by a very large number

number in the 16-20 inch class, some of which can be cut along with those now in the 21-25 inch class; and, for the rest, it does not seem desirable to hold over trees in the 26" class many of which are unsuited to long revolutions

The number of trees annually exploitable is $\frac{24,823}{25} = 993$

The average tree for the 26" class contains $\frac{2\,324,020}{24,823} = 93$ c'

The contents of the annually exploitable trees are

therefore, $993 \times 93 = 92,349$ c'

Do Do squared $= 73879$ c'

$= 1,477$ tons

Park No. I
Guanacaste
Teak

The number of trees in the 21-25 inch class is 17,065
Do. in Do. ____ 26" " ____ 8,985
Total 26,050

The rate of growth in diameter of the 21-25 inch class is .06 Therefore trees in that class require 5 ÷ .06 = 83 years to grow in the next class.

The inferior classes being well represented with the exception of the 6-10 inch ones, I propose to cut, during that period, a number of trees equal to half the sum of the two oldest age-classes, or 26,050 ÷ 2 = 13,025. Of these 8,985 belong to the 26" class
4040 ____, ____ " 21-25" "

The number annually exploitable is
of the 26" inch class 8,985 ÷ 83 = 108
of the 21-25" ____ " ____ 4,040 ÷ 83 = 49

The average tree of the 26 inch' class contains 1,319,995 ÷ 8,985 = 14.7 C'

do do 21-25 inch' class 1,339,825 ÷ 17,065 = .78 C'

The contents of the 26 inch' class annually exploitable are 108 × 147 = 15,876 C'

do do 21-25 inch' class 49 × 78 = 3,822 C'

Total contents annually exploitable of both classes in the ground ——— = 19,698 C'

do do —— squared = 15,758 C'

= 315 tons

Blackwood

The 21-25 inch class contains 1,160 trees

16"-20" " 4,152 "

Total 5312

The rate of growth in diameter of the 16-20 inch' class is 117. Therefore trees in that class take 5 ÷ .117 = 43 years to grow into the next class During this period, I propose to take out a number of trees equal to half

the sum of the trees in the two oldest classes, or 5,312 ÷ 2 = 2,656.

Of these 1,160 belong to the 21-25 inch class

" 1,496 " " 16-20 " "

The number annually exploitable co

of the 21-25 inch' class 1160 ÷ 43 = 27

16-20 " " 1496 ÷ 43 = 35

The average tree of the 21-25 inch' class contains 50,751 ÷ 1160 = 44 c'

do do 16-20 inch' class 100,843 ÷ 4152 = 24 c'

The contents of the 21-25 inch class annually exploitable are 27 × 44 = 1188

do do 16-20 inch' " 35 × 24 = 840

Total contents annually exploitable in the forest = 2,028

do do squared = 1,622

= 32 cords.

Mate

The rate of growth in Diameter of the 21-25 inch' class is .115. Therefore trees in that class take 5 ÷ .115 = 43 years to grow into the next higher class

The proportion of trees in the classes does not seem to warrant the cutting during this period of more than the number of trees now in the 26 inch class.

The number annually exploitable is therefore 4818 ÷ 43 = 113

The average tree of the 26" class contains 507,071 ÷ 4818 = 105 c'

And the contents annually exploitable in the ground are 113 × 105 = 11,865 c'

Do. Do. Reduced = 9,492

= 190 tons

Kindali

The number of trees in the 21-25 inch' class is 10,078

26" ? 5,850

15,928

The rate of growth in diameter for the 21-25 inch' class is 128. Therefore the trees in that class require 5 ÷ 128 = 39 years to grow into the next class

The

The state of the age-classes seems to warrant the cutting during that period of a number equal to at least half the sum of the trees now in the 2 oldest classes, or 15,928 ÷ 2 = 7,964

Of these 5,850 belong to the 26 inch' class

And 2,114 " 21"-25" "

The number annually exploitable is

of the 26" class 5,850 ÷ 39 = 150

do do 21-25 " 2,114 ÷ 39 = 54

The contents of the average tree of the 26 inch' class are 805,465 ÷ 5,850 = 138 c'

do do 21"25" " " 740,479 ÷ 10,078 = 73 c'

The contents of the 26 inch' class annually exploitable are 150 × 138 = 20,700 c'

do do 21 25 " " 54 × 73 = 3,942 c'

Total contents annually exploitable in the round = 6,012 c'

do do reduced = 4,810 c'

= 96 tons

Jamaica

The number of trees in the 21-25 inch class is 30,203

" " " 26 " " " 11,488

Total 41691

The rate of growth in diameter for the 16-20 inch class is .134 Therefore trees in that class will take 5 ÷ .134 = 37 years to grow into the next class

The age-classes was cut the cutting of all exploitable trees during that period of these 11,488 belo j to the 26 inch class

30,203 " " 21-25

The number annually exploitable is

of the 26 inch class 11,488 ÷ 37 = 310

do do 21-25 inch. 30,203 ÷ 37 = 816

The average tree of the 26 inch class contains 661,881 ÷ 11,488 = 57 c'

do do 21-25 inch 1,173,335 ÷ 30203 = 39 c'

The contents of the 26 inch class annually exploitable are 310 × 57 = 17,670

do do 21-25 816 × 39 = 31,824

Total contents of both classes annually exploitable in the round — 49434
Do. — Do. — do. — square = 39,595
= 792 tons

Kāra

The rate of growth in diamet of the 16-20 inch class is .141 Therefore, the trees in that cla will take 5 ÷ .141 = 35 years to cro into the next class

The state of the age-class does not seem to warrant th cutting of over 16,000 trees.

of these 16,000,

10,446 trees are in the 26 inch class
5,554 " " 21 25 "

The number annually exploitab of the 26 inch class is 10,446 ÷ 35 = 298
do do 21 25 inch class 5,554 ÷ 35 = 159.

The average tree of the 26 inch cla contains - 1,095,338 ÷ 10446 = 105, c
Do Do 21 25 " 632,934 ÷ 11,732 = 54 c

The contents of the 26 inch class annually exploitable are 298×105=31,290

Do Do 21-25 inch 159×54=8,586

Total of both classes annually exploitable in the pound = 39,876

Do Do Squared = 31,901

= 638 tons

Parts No II

Guard only

Teak.

Number of trees of 21-25 inches 26,053

do do 26" ——— 9474

35,527

Rate of growth in diameter of the 21 25 inch' class is .06 Therefr the trees in that class will take 5 ÷ .06 = 83 years to grow into the 26 inch' class

It is proposed to cut half the num of the trees in the 2 last classes during that period or $\frac{35,527}{2} = 17,763$ of which

9474 are of the 26" class
8289 in the 21-25 class

The number of trees of the 26" class annually exploitable is $\frac{9474}{83} = 114$

do do of 21-25 is $\frac{8289}{83} = 100$

Average tree of 26" class $= \frac{1,060,548}{9474} = 112$

do do 21-25 inch' class $\frac{1,328,573}{26,053} = 51c$

contents in the pound of the annually exploitable

26 inch timber = 114 × 112 = 12,768
21" 25" " " = 100 × 51 = 5,100
Total contents of both = 17,868
Do. Squared = 14,294
= 286 tons.

Blackwood

The 21-25 inch class contains 3,791 trees
The 16-20 " " 2,526 "

Number of trees equal to ½ half the sum of the trees in these 2 classes may safely be cut during the 1st period
The rate of growth of 16-20 inch trees is 117 Therefore, the trees in that class will require 5 ÷ 117 = 42 years to grow into the next class.

The number of trees exploitable during the period is

$$\frac{3791 + 2526}{2} = 3,158$$

Of these, all are in the 21" 25" class.

The number to be cut annually 117

is $\frac{3158}{42} = 75$.

The average tree is $\frac{155,458}{3,791} = 41\,c'$

The coulents in the period to be exploited are, therefore, $75 \times 41 = 3075\,c'$

to be squared $= 2460\,c'$

$= 49$ tons.

Mati

There is a considerably excess of old exploitable wood.

The class 21-25 inches contains 2152 trees

" 26" " 4,627 "

is proposed to cut during the first period half the sum of these 2 classes, namely $\frac{6779}{2} = 3389$

The rate of growth of the 21-25 inch class is .115 in diameter. Therefore trees in that class will take $\frac{5}{.115}$ 43 years to grow into the next class.

The trees to be exploited numbering 3,389 are all in the 26" class

The average tree contains

$\frac{428,669}{4,627} = 93$ c'

The number of trees annually exploitable is $\frac{3389}{43} = 79$.

The contents of the annually exploitable timber in the pound are, therefore, $79 \times 93 = 7,347$ c'

or 20 : Squared = 5878

= 118 tons

Nāuā

The 16-20 inch class contains 17,460 trees
The 21-25 inch " contains 15,968 trees
The 26 inch " " 7,159 trees

There is rather a paucity of stock in the age-classes below the 16-20 inches' class. It is therefore proposed to cut only 18,000 trees during the first period of 35 years. This will leave 23,378 trees in the 16-20 and the 21-25 inch classes, of which 5,918 are now in the latter class

H.

The rate of growth in "'s diameter is .115 for the 16-20 inch class. Therefore the trees in it will take $\frac{5}{.115} = 43$ years to grow into next class.

The number of trees to be exploited during this period is

of the 26" class 7,950
21-25" " 10,050
Total 18,000

The average tree of the

26" class = $\frac{670,241}{7,950} = 84$ c'

do [illegible] p. $\frac{850,588}{15,968} = 53$ c'

The number of 26" trees annually exploitable is $\frac{7950}{43} = 185$

do do 21"-25" class is $\frac{10,050}{43} = 234$

Contents of 26" trees annually exploitable are $185 \times 84 = 15,540$

do do 21"-25" trees " $234 \times 53 = 12,402$

Total contents annually exploitable in the round = 27,942

do do squared = 22,354

= 447 "cuts"

Yamba

Number of trees in 16-20 inch class = 71,185.
21-25 " " " = 35,981
26-? " " " = 12,211
119,377

The rate of growth in diameter is 1/33 for the 16-20 inch class consequently, trees in that class take $\frac{5}{1/33} = 37$ years to grow into the next.

The younger age-classes are well represented. It is proposed to cut a number of trees equal to half the sum of the trees in the 3 oldest classes during the 37 years, or $\frac{119,377}{2} = 59,688$.

Of these 12,211 are 26" trees
35,981 21" 25 "
11,496 16"-20" "

The number annually exploitable are of 26" class $\frac{12,211}{37} = 330$
21-25 " $\frac{35,981}{37} = 972$
16-20 " $\frac{11,496}{37} = 311$

Average tree of 26" class 1,105,667 ÷ 12,211 = 91c'
do do 21-25 " 2,186,667 ÷ 35,981 = 61c'
do do 16 20 " 1,870,610 ÷ 71,185 = 26c'

The contents in the rounds of timber annually exploitable are

For 26" class 330 × 91 = 30,030 c'
" 25 " 972 × 61 = 59,292 c'
16-20 311 × 26 = 8086 c'

Total exploitable in the

3 classes in the forest = 97,408 c

" do do reserved = 77,926 c

= 1,559 tons

Kindal

The 21-25 inch class contains 11,994 trees

26 " do " " 7,383 "

Together 19,377

The rate of growth in diameter for the class 21-25 inches is .13. Consequently the trees in that class will take $\frac{5}{.13}$ = 38 years to grow out of it. It is proposed to exploit during that period a number of trees equal to half the number of the trees in classes 21-25 and 26" or 9688.

Of these, 7,383 are in the 26" class.

And 2,305 are in the 21-25 class.

The number of 26" trees annually exploitable is 7383 ÷ 38 = 194.

do do 21"-25" is 2,305 ÷ 38 = 61

The average tree of the 26" class contains 975,513 ÷ 7383 = 132 c'

The average tree of the 21-25 class contains ——— 521,780 ÷ 11,994 = 44 c'

The contents of the 26" trees annually exploitable are 194×132=25,608

do do 21-25" " " " 61×44=2,684

Total annually exploitable in the round = 28,292

do do squared = 22,634

= 453 tons

Other species

The 16-20 inch class contains 5,861 trees
21-25 " " " - 3,556
26-? " " - 3,527

The rate of growth is taken ½ for the 21-25 inch class the increment not having yet been determined but in any case it must be very approximate as the class contains many species. The rate chosen is well within the safety-limit

The rate of growth in diameter being taken at ½ for the 21-25 inch class, it follows

follows that the trees (now) of that class will take $\frac{5}{1} = 50$ years to grow into the next class

It is proposed to cut out during that period all trees of 26".

The number annually exploitable will, therefore, be —

$3527 \div 50 = 71$

The average tree contains for this class $432{,}639 \div 3{,}527 = 123$ c'

The cubic contents of the trees annually exploitable in the round are $71 \times 123 = 8{,}733$

Do Do squared $= 6{,}986$

$= 140$ tons.

J. A. Mackenzie
Conservator of Forests

Party No I

Statement shewing the major-classes number of trees & cubic contents of timber excluding Gund.

Major class	No. of trees	cubic contents of timber in the round feet	Increment of diameter per annum in inches	Cubic increment per cent in feet
		Teak		
6 - 10	58,984	430131·236	·10	1·6
11 — 15	114,919	2407842·348	12	1·5
16 — 20	98,552	3798088·900	·05	·73
21 — 25	62,443	4802,936 201	05	·73
26 — ?	35400	5,021,404·686	·06	66
		Wood		
6 — 10	42,419	203,010 217	·15	2·7
11 — 15	65726	929,882·398	15	2·2
16 — 20	30,420	1193097·480	11	1·7
21 — 25	11,695	699,411·623	·09	13
26 — ?	861	97,246 121	08	11
		[illegible]		
6 — 10	32518	164767·275	10	2·7
11 — 15	64288	1293,621·916	·10	1·8
16 — 20	50,622	1755,277 483	08	13
21 — 25	31,382	2,547,995·736	·11	1·08
26 — ?	13664	1758,269 567	09	92
		Kindred		
6 — 10	59838	365,679·991	·11	3·1
11 — 15	87609	1476,983·137	·17	2·2
16 — 20	51,292	1,547,786 473	15	1·7
21 — 25	32504	1887,520·108	12	15
26 — ?	18140	2,004,548 022	·11	1·2
		Jamkhan		
6 — 10	195805	891282·809	·11	2·9
11 — 15	194688	2887,260 752	·12	2·1
16 — 20	96677	2769055·386	·13	1·4
21 — 25	39279	2571,707·975	·12	1·3
26 — ?	17430	1373860·569	·11	12
		Jarul		
6 — 10	17,388	109,731·612	·13	3·3
11 — 15	36251	983,365·468	·18	2·1

6—20	27,294	1,280,067·247	·14	1·4
21—25	2,778	1387905·667	·08	1·1
26—?	9,135	1,008,862·066	·08	·9
		Dhamma		
6—10	37,122	180,478·228	·17	4·4
11—15	23,471	325,243·096	·12	2·1
16—20	8,840	177,252·197	·15	2·2
21—25	1,543	56,243·604	·11	1·6
26—?	336	30,738·616	·10	1·2
		Hamric		
6—10	"	"		
11—15	"	"		
16—20	2,735	52,919·232	·22	2·8
21—25	917	40,681·074	·16	1·7
26—?	155	13,503·199	·18	1·7
		Hoddi		
6—10	"	"	"	.
11—15	6,689	172 491·767	·44	·74
16—20	"	"	.	.
21—25	3,701	137,177·311	·05	1·2
26—?	4,662	565,972·141	12	1·09
		Dindas		
6—10	34,067	221,012·463	·07	1·6
11—15	34,267	595 248 723	07	90
16—20	8,565	313,126 287	·06	·91
21—25	750	65,663·177	16	2·6
—10	5,649	54437·656	09	2·4
11—15	8,510	162 735·661	·12	2·4
16—20	2,800	139,431·816	10	1·4
21—25	"	.		
26 ?	.	.		
		Judges		
11—15	243	4,543 792	·11	2·09
16—20	315	13,029·466	·13	1·8
		Rabys		
6—10	"	"		
11—15	"	"		
16—20	882	24,290·476	·17	2·3
21—25	220	13,381·196	·19	1·9

Jadav
Dec 1952

Edmunds
(Musical Director of Jazz)

Party No II

Statement showing the major classes number of trees and cubic contents of timber excluding Gundi

Major classes	Number of trees	Cubic contents of sound timber	Increment of diameter per annum in inches	Cubic increment per cent per annum in feet
		Feet		
		Teak		
6 — 10	380123	1,506,420·669	15	4·73
11 — 15	286,969	3,774,829 846	122	2 37
16 — 20	164,800	5,742,289·596	15	2·16
21 — 25	80,736	6,357,872·530	·13	1 71
26 — ?	52,957	5861,831·818	·11	1·2
		Blackwood		
6 — 10	61,495	368,446·988	13	3·8
11 — 15	113,604	1,977,209·932	13	2·8
16 — 20	80,419	2,138,760·118	13	2 007
21 — 25	32078	1,716,308·677	13	1·6
26 — ?	6316	711,965 004	11	1·4
6	10 141,284	525,469·321	·20	6·3
11 — 15	100,693	1304,196·929	16	3·2
16 — 20	92,781	2,988,033·473	·14	2·1
21 — 25	64,651	3,766,913 167	·13	1·5
26 — ?	34,116	3284,181·188	·12	13
		Venta		
6 — 10	73,550	286,525·592	24	6·4
11 — 15	50810	710,243·100	·19	3·7
16 — 20	26685	780,306·214	·18	22
21 — 25	12037	842 105·897	·13	16
26 — ?	4560	444,479·956	15	15
		Jamba		
6 — 10	248,969	1,092,186·482	·18	5·1
11 — 15	202 362	3,406,725·953	·18	32
16 — 20	74 741	2,760 160·940	·15	2·2
21 — 25	23,490	1447,030 151	·13	1·6
26 — ?	3,451	415,693·868	·14	1·6

		Kindaki		
10	41,924	213,349·777	·20	5·1
15	55,172	934,818·037	·18	3·3
20	42,490	1122,031·596	·17	2·5
25	19,729	1292,879·893	·15	1·7
?	22,900	2,407,805·512	13	1·4
		Jus glewpod.		
10	3,280	813,507·668	·19	5·4
15	113,400	1,492,885·994	·19	3.6
20	45,947	1,333,671·798	·16	2·3
25	15,201	820,076·840	·19	2·4
?	24,823	2,324,020·052	·17	1·8

Jaden Dec 23d
1889

J. A. Lumsden
Conservator of Forests

Early 1907

1154

Statement showing the major classes, number of trees and contents of lumber of the Gund Forests.

(each species taken seperately)

Major classes	Number of trees	Cubic contents of sound timber feet	Increment Cubic measurement of diameter per annum cent in inches	Increment Cubic measurement per annum cent in feet
		Teak		
6 - 10	11,337	76,682,185	.10	1.6
11 15	24,317	486,092.368	12	1.5
16 20	25,928	921,425.505	05	78
21 25	17,065	1339,825.687	.05	.73
26 ?	8985	1319,995.962	06	.66
		Blackwood		
6 10	3820	20270 640	15	2.7
11 15	6622	105746 036	.15	2.2
16 20	4152	100,813 397	.11	1.7
21 25	1160	50751.723	09	13
26 ?	"		"	"
		Mal.		
6 — 10	5302	41,[illegible] 218	.16	2.7
11 — 15	7440	126 [illegible] 611	10	1.8
16 — 20	7938	34,566 933	08	.3
21 25	5336	498 434 943	11	1.08
26 ?	4818	507 071.906	.09	.92
		[illegible]		
6 - 10	13,452	82819 086	11	3.1
11 15	20152	345,780.065	17	2 2
16 - 20	16 114	405,906 618	15	1.7
21 - 25	10 078	740,479.399	12	1.5
26 - ?	5 850	805 465 461	11	12
		Jarrula		
6 10	29,433	193,695 706	11	2.9
11 - 15	65 048	840 260 999	.12	2 1
16 - 20	37,098	1,573 497.440	13	1.4
21 - 25	30 203	1173 335 627	12	1.3
26 - ?	11 485	661,881 642	11	1.2
		Vatica		
6 10	3701	32,191 170	13	3.3
11 15	10 015	134 908.655	18	2.1
16 20	4 961	511,525.464	.14	1.4
21 25	11 730	632,934.477	.08	1.1
26 - ?	10 446	1,095,338.807	.08	.9

Indn. Dec 23rd 1907

J. Sturrock

Conservator of Forests

		Kendall		
6—10	41,924	213,349·777	·20	5·6
11—15	55,172	934,818·037	·18	3·3
16—20	42,490	1,122,031·596	·17	2·5
21—25	19,729	1,292,879·893	·15	1·7
26—?	22,900	2,407,805·512	·13	1·4
		Junglewood		
6—10	3,280	813,507·668	·19	5·4
11—15	113,400	1,492,885·994	·19	3·6
16—20	45,947	1,333,671·798	·15	2·3
21—25	15,201	820,076·840	·19	2·4
26—?	24,823	2,324,020·052	·17	1·8

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1889

L L Lumsden
Commissioner of Immigration

Carry Not 487

Statement showing the major classes, number of trees and cubic contents of timber of the Gund Forests.
(each species taken seperately)

Major classes	Number of trees	Cubic contents of timber felled	Increament of diameter per annum in inches	Cubic increament per cent on feet
		Teak		
6 – 10	11,337	76,682.185	.10	1.6
11 – 15	24,317	486,092.368	.12	1.5
16 – 20	25,928	921,425.505	.05	.78
21 – 25	17,065	1,339,825.687	.06	.73
26 – ?	8985	1,319,995.962	.06	.66
		Blackwood		
6 – 10	3820	20,270 640	.15	2.7
11 – 15	6622	105,746.025	.15	2.2
16 – 20	4152	100 843 397	.11	1.7
21 – 25	1160	50 751.723	.09	1.3
26 – ?	"		"	"
		Wal		
6 – 10	5302	41 [illegible] 218	.10	2.7
11 – 15	7440	106 06[illegible] 611	.10	1.8
16 – 20	7958	314,566 933	.08	1.3
21 – 25	5336	498 434 943	.11	1.08
26 – ?	4818	507 071 [illegible]06	.09	.92
		[illegible]		
6 – 10	13652	8[illegible]819 086	.11	3.1
11 – 15	[illegible]0 159	345,780 065	.17	2.2
16 – 20	16 11[illegible]	405,906 618	.15	1.7
[illegible]1 – [illegible]6	10 078	740,479 399	.12	1.5
[illegible]6 – ?	5850	[illegible]05 465 461	.11	1.2
		[illegible]		
6 – 10	29 433	1[illegible]3 695 706	.11	2.9
11 – 15	65 048	840 260 9[illegible]9	.12	2.1
16 – 20	57,098	1,573 497 440	.13	1.4
[illegible]1 – 25	30 [illegible]03	[illegible]173 33[illegible] 627	.12	1.3
26 – ?	11 498	661 881 642	.11	1.2
		Yaka		
6 – 10	3[illegible]7[illegible]4	3[illegible] 191 170	.13	3.3
11 – 15	10 [illegible]19	134 908 655	.18	2.1
16 – 20	4[illegible]7[illegible]1	511 525 464	.14	1.4
[illegible]1 – [illegible]5	11 73[illegible]	63[illegible] 934 477	.08	1.1
26 – ?	10 446	1095,338 807	.08	.9

[illegible]
[illegible]

Conservator of Forests

Early Note

Statement shewing the Major classes number of trees, and cubic contents of Timber of the Gum & Karri.

(each species taken separately)

Major class		Number of trees	Cubic contents of rand Timber feet	Increment of diameter per annum in inches	cubic increment per cent on feet
			Gum		
6	10	13,230	80022·820	15	4 73
11	15	37,370	554,873·721	122	2 37
16	20	45,218	1,875,219 479	15	2·16
21	25	26,053	1,328 513 017	13	171
26	?	9,474	1,060,548·963	11	12
			Blackwood		
6	10	2,001	[illegible]	[illegible]	[illegible]
11	15	3,706	90,325 637	·13	2·5
16	20	2526	85,858·035	·13	2 007
21	25	3,791	155,458 851	·13	1·6
26	?	"	"		
			Mahogany		
6	10	4,782	19,414·043	20	6·3
11	15	4,980	117,092 747	·16	3·2
16	20	3,108	136,354 962	·14	2 1
21	25	2,152	86 954 361	13	15
26	?	4,627	428,669·751	·12	1·3
			Karri		
6	10	5,140	16,963·379	·24	6·4
11	15	11,447	312,490·890	·19	3 7

16-20	17,460	431,319·148	·16	2·2
21-25	15,968	850,588·268	·13	1·6
26-?	7,950	670,241·243	·15	1·5
		Jämbä		
6-10	31,196	162,509·857	·18	5·1
11-15	72,587	986,282·542	·18	3·2
16-20	71,185	1,870,610·782	·15	2·2
21-25	35,981	2,186,667·047	·13	1·6
26-?	12,211	1,105,667 305	11,	1·6
		Kendali		
6-10	10,161	45,522·584	·20	5·6
11-15	21,321	383,119·022	18	3·3
16-20	17,672	594,983 199	17	2·5
21 25	11,994	521,780·234	15	1·7
26-?	7,383	975,513·291	13	14
		Jungfernwald		
6-10	9,190	34,910·840	19	5·4
11 15	6,396	113 842 223	19	[illegible]
16 20	5,861	215,571·332	16	2·3
21 25	3,556	233,445·499	19	2·4
26 ?	3,527	432 639·080	17	1·8

Judae Decis 1887 ½.

Forstmeister

Statement showing the areas of the Forests as calculated from the Revenue Survey and topographical maps.

No	Names of villages	Forest areas of Revenue Survey	Forest area of the Topographical Survey	Difference Increase	Decrease
1	Purli	3134·845	3093·46	.	41·385
2	Hudse	3995·745	3800·00		195·145
3	Mandurli	5007·875	5231·05	223·175	"
4	Virnoli	4359·82	4376·55	16·73	"
5	Phansoli	2770·0	2606·10	"	163·90
6	Amyaugn	3047·925	3149·40	101·475	"
7	Sheroli	1542·7	1542·7	equal	
8	Sammanagi	2371·95	2378·95	do	
9	Kowtie	2976·5	not known	———	
10	Vinchali	2866·678	do	———	
11	Gutta	2419·20	do	———	
12	Kalbhan	1082·05	1049·20	"	32·85
13	Gund	6788·0	6500·40	.	287·60
14	Bhidasgadde	450·0	not known	———	
15	Ermukh	4000 0	do	———	
16	Kanyadi	1574·925	do	———	
17	Gavegali or Banum	6090·200	6377·000	286·800	"
18	Kulge	3338·800	3351·150	12·350	"
19	Jambge	3425·200	not known	———	
20	Ambge	5433·250	do	———	
21	Poleli	2952·750	2903·500	"	49·250
	Carried forward	69635·413		640·530	770·130

		1265·575	do	———
36	Mavuvale	3295·100	do	———
37	[illegible]	941·100	do	———
38	Vellvad	1914·325	do	———
39	[illegible]	1779·100	do	———
40	Gelival	2123·350	do	———
41	Badrangur	3060 600	do	———
42	Akalinga	1130·125	do	———
43	Kondle	2011·525	do	———
44	Agaru	2847·000	do	———
45	Damdali	648·750	do	———
46	Baldakamudde	3248·350	3550·900	302·550
47	Veranpale	6014 975	[illegible]	———
48	Kanvil	1607·250	do	———
49	Kambakhole	714 275	[illegible]	[illegible]
50	Kambakhole II	742·300	[illegible]	———
51	Kambadi	3076·575	do	———
52	Karigampale	1235·725	do	———
53	Kyaval	1011·175	do	———
54	Shevale	4574·675	do	———
	Total	117414·613		9403·081 770·130

Carried forward
Distance [illegible]
1969

[illegible]
Commissioner of [illegible]